



India Connecting Continents (ICC)

Study materials for FMGE

www.indiaconnectingcontinents.com
indiaconnectingcontinents@gmail.com
(+86)15069629250 , (+91)93441 60131

ENT

LARYNX

- * Made of 6 cartilages:
- * 3 unpaired:
 - Thyroid
 - Cricoid
 - Epiglottis
- * 3 paired:
 - Arytenoids
 - Corniculate } rudimentary
 - Cuneiform } cartilage
- * Thyroid & Cricoid are palpable from outside.
- ^{MCA} * Cricoid is a ring like cartilage ^(signet ring)
- * Epiglottis & Arytenoids lie inside the larynx.
- * Epiglottis a leaf like cartilage attached to the midpoint of thyroid cartilage. inside larynx.
- * Epiglottis covers the vocal cords
- * Vocal cords = Glottis
- ^{MCA} * Epiglottis is elastic cartilage
- ^{MCA} * It does not ossify with age.

Arytenoids

- * Make posterior 1/3 of vocal cord.



True vocal cord

Thyroid angle

- * It is the angle b/w two lamina of thyroid cartilage.
- * It In males: 90°
females: 120°
- * Prominence of thyroid cartilage in male is called as:
Adam's apple
- ⇒ Males have low pitch voice (thick)
- ⇒ Females have high pitch voice (sharp)

Puberphonia

- * It is high pitch voice in males (feminine voice)
- * Rx: Speech therapy (6 months)
- ↓
- GLUTZMANN'S MANEUVER
- ↓
- Person speaks while pushing thyroid cartilage backwards
- ↓
- If it fails then Sx is done called as

Type III Thyroplasty
(Surgical shortening / loosening of the vocal cord.)

Androphonia

* Low pitch voice in females.
(ie, masculine voice)

* ~~Sex~~ Rx: Surgery called as



Type IV thyroplasty
(surgical lengthening / tightening
of the vocal cord)

⇒ There are 2 membranes outside
the larynx.

1) Thyroid membrane



It is pierced by

- (i) Internal branch of (SLN)
superior Laryngeal nerve
- (ii) Laryngocele.

2) Cricothyroid membrane



It is the site of
cricothyroidotomy



It is done in airway
emergencies when
tracheostomy is going
to ~~take~~ take time.

Mucosa of larynx

* Larynx is lined by ciliated
columnar epithelium except
vocal cord.

* Vocal cord is lined by stratified
squamous epithelium.



In some smokers, vocal cord
epithelium starts shedding
off at a very fast rate



Muc called as Keratosis larynx ✓



- It is a pre-malignant condition
- Chief complaint: Hoarse voice



Rx: Stripping of vocal cord mucosa
(Decortication)
+ Stop smoking.



Other Rx: is CO₂ laser cordectomy

⇒ Vocal cord in abducted position
during respiration

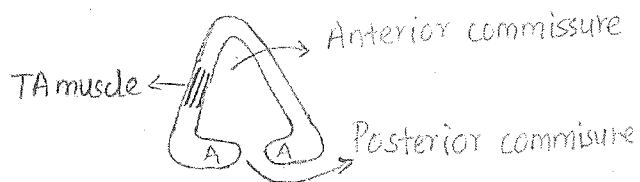
⇒ Vocal cord in adducted position
during speaking

⇒ Trachea: starts at level of C₆

Division of Larynx

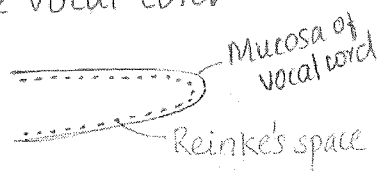
A) Glottis = True vocal cord

- Length → 18-23 mm in males
16-17 mm in ♀



- Posterior commissure is also called interarytenoid space.
- Interarytenoid muscle b/w arytenoids.
- Thyroarytenoid muscle lies in the vocal cord.

- MCA ✓
- Reinke's space → subepithelial loose connective tissue layer in the vocal cord



- Edema of Reinke's space is called as Reinke's edema. MCA

• Causes :

- (1) Smoking (MC cause)
- (2) Vocal abuse

- Rx : Stripping of vocal cord mucosa.

B) Supraglottis :

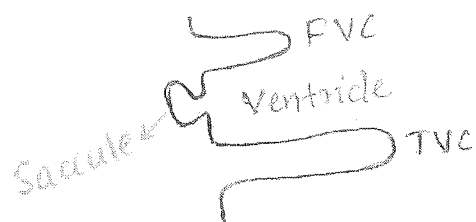
* It has 5 parts

- (1) Epiglottis
- (2) Aryepiglottic folds
- (3) false vocal cord / Ventricular bands
- (4) Ventricle.
- (5) Sacculae.

* False vocal cord is the inward turning of aryepiglottic fold. It is rudimentary

* Ventricle → space b/w true vocal cord & false vocal cord

* Sacculae → mucosal outpouching from the ventricle.



MCA ✓ * Laryngocele → Abnormally dilated sacculae.

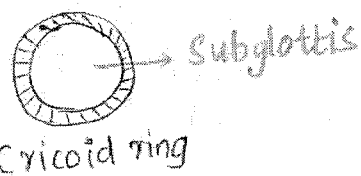
MCA ✓ * We speak using true vocal cord.

Dysphonia Plica Ventricularis

- * It is production of sound from false vocal cord.
- * Rx: Speech therapy.

c) Subglottis:

- * ~~Below the~~ Empty space inside the cricoid ring.



Lymphatic drainage

- MCA ✓ * Vocal cords have no lymphatics
- * Supraglottis has rich lymphatics
- MCA ✓ * Subglottis drains into the Delphian lymph node (also called as prelaryngeal LN)

Functions of larynx

- 1) Primary function is protection of lower airway (ie, lungs)
- 2) Phonation (production of sound)
↓
from true vocal cords, in adducted position (closed) in expiratory phase of respiration.

Muscles of larynx

* Abductor

- ✓ - Only one abductor muscle
↓
Posterior cricoarytenoid muscle

* Adductors (4)

- 1) Lateral cricoarytenoid muscle
- 2) Inter arytenoid muscle
- 3) Thyroarytenoid muscle
- 4) Cricothyroid muscle.

* Tensor muscles

- (1) Cricothyroid muscle (main)
- (2) Vocalis

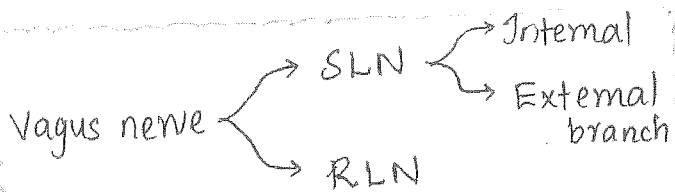
↓
Provides quality of voice
(ability to change the frequency)

- MCA ✓ * All these muscles lies inside the larynx except cricothyroid.

Nerve supply

- * All these muscles are supplied by → Recurrent laryngeal nerve (RLN) except cricothyroid

↓
which is supplied by the external division of SLN (sup. laryngeal nerve)



Sensory supply of larynx

- * Above vocal cord → Internal branch of SLN
- * Below vocal cord → RLN
- * Vocal cord → Both of nerves.

Difference b/w paediatric & adult

MCQ Larynx

| | Paediatric | Adult |
|------------------|------------------------------------------------|-----------------------------------------------|
| • Location | High in neck C ₂ -C ₃ | Low in neck C ₃ -C ₆ |
| • Narrowest part | Subglottis (MCQ) | Glottis |

⇒ A patient while having dinner suddenly gets a choking sensation & aphonia

↓
food bolus stuck as laryngeal foreign body.

↓
Immediate Rx: Heimlich's maneuver.

↓
Pressure is given on epigastric in upward & backward direction.

* Laryngocele → presented as air filled neck swelling

* Bryce Sign: Gurgling sound produced when laryngocele is pressed.

* Rx. of laryngocele: Excision

Vocal cord paralysis

* Left: Right = 4:1

↓
Because of longer course of left recurrent laryngeal nerve

* Relations of left RLN:

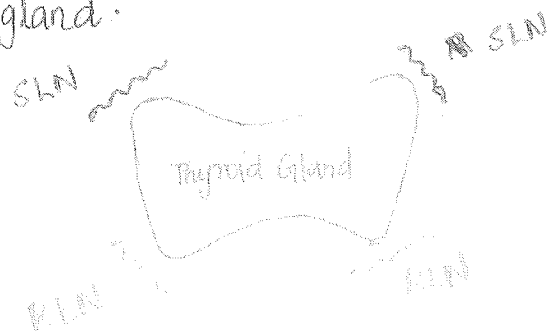
- Arch of Aorta
- Left Atrium
- Left Lung
- Left bronchus
- Oesophagus
- Mediastinal LN

* Relations of right RLN

- Subclavian artery
- Apex of Rt. lung

* Common relations:

In the neck, both the nerves lies close to lower pole of thyroid gland.



Causes of vocal cord paralysis

- 1) Idiopathic (unknown)
- 2) Carcinoma bronchus
- 3) Carcinoma thyroid
- 4) Carcinoma esophagus
- 5) Thyroid surgery
- 6) Neck trauma
- 7) Vagus paralysis (RLN is a branch of it)

MCA

⇒ MCC of unilateral vocal cord paralysis

Idiopathic > Ca bronchus (malignancy)

MCA

⇒ Ortner's syndrome: Left atrio-megally causing left vocal cord paralysis.

(Rheumatic heart disease → left atrio-megally)

Bilateral abductor palsy

* Cause: When both RLN are cut during thyroid surgery.

↓
Only cricothyroid muscle left & it is an adductor

↓
Both vocal cord comes in midline position

(Median / Paramedian position)

Respiratory distress & stridor

Normal voice

* Immediate Rx. → Tracheostomy

↓
Wait for 6 months
(chance for shrinking of VC)

↓
If no improvement

↓
MCA Rx OC: Type II thyroplasty
(Lateralisation of vocal cord)

↓
Other Rx: CO₂ laser cordectomy / CO₂ laser arytenoidectomy.

Bilateral adductor paralysis

When both side RLN & SLN are cut during thyroid surgery

or
When vagus is paralysed on both sides

↓
No muscle left now

↓
Vocal cord lie in cadaveric position (intermediate position)

i.e., open

Aphonia

Aspiration

↓
Wait for 6 months

↓
If no recovery seen

↓
RxOC: Type I thyroplasty
(Medialisation of vocal cord)

↓
Other Rx: Taflon injection in
to the vocal cord.

MCA
⇒ If SLN is cut during ~~thyroid~~
(DNB) thyroid surgery

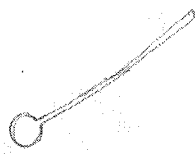
↓
Cricothyroid lost
(main tensor muscle)

↓
Poor quality of voice.

Methods to examine larynx:

1) Indirect laryngoscopy (I/L)

↓
With the help of
I/L mirror



(DNB) ↓
The mirror surface is warmed
before using

MCA I/L does not shows:

- 1) Anterior commissure of VC
- 2) Laryngeal surface of epiglottis
- 3) Ventricle
- 4) Subglottis

2) Fibre optic laryngoscopy (FOL)

↓
Done with the help of
flexible endoscope, passed
through the nose.

3) Direct laryngoscopy (D/L)

It is an OT procedure.
Done inside operation theatre
↓
D/L is always held in the
left hand of right handed doctor

⇒ I/L & FOL are done in OPD
But D/L in OT.

Micro laryngeal surgery (MLS)

It is surgery of vocal cord
done under the microscope.

↓
MCA Focal length of ENT microscope
Ear : 200 mm / 250 mm
Nose : 300 mm
Larynx : 400 mm

| | |
|---|---|
| E | 2 |
| N | 3 |
| T | 4 |

⇒ MLS is pneumatic of thyroplasty
M → I (medialisation)
L → II (lateralisation) of vocal cord
S → III (shortening)
LV → IV (lengthening/tightening)

Laryngomalacia (Important)

- * Also called as congenital laryngeal stridor
- * MC congenital anomaly of larynx.
- * It is weakness of larynx

↓
Supraglottis

↙ ↘
Epiglottis Aryepiglottic fold.

- * Chief complaint -

Inspiratory stridor

(stridor → noisy breathing)

- * Stridor starts in the first week of life.
- * It increases on crying. (deep inspiratⁿ)
- * It decreases in prone position (lie on tummy)

- * Examination shows omega shaped epiglottis (folded)



mca

- * Rx: No Rx. required
(= Conservative Rx.)

↓

Reassure parents that it is a self limiting condition.

mca

- * In laryngomalacia, cry is normal because vocal cords are normal.

mca

- * Laryngomalacia is the MCC of congenital laryngeal stridor
(or neonatal stridor)

Paediatric laryngeal infections

↓

These are airway emergencies
(due to edema of larynx)

(1) Acute Epiglottitis:

- * Infection of supraglottis
- * Caused by H. influenza B (HiB)

- * Age: 2-7 years

- * Chief complaint:

- Fever
- Respiratory distress
- Stridor

- * Child sits down bending forwards

↓

TRIPOD SIGN

- * X-ray soft tissue neck, lateral view shows

↓

Thumb sign

(swollen epiglottis)

mca

- * Rx:

- (1) First establish the airway by intubation / tracheostomy
- (2) Antibiotics
- (3) Steroids

(2) Acute laryngotracheobronchitis

- * Also as ALTB / Croup.
- * Infection of complete airway but subglottis is most affected.
(subglottis - narrow in paedia.)
- * Caused by parainfluenza virus
- * Age: 3 months - 3 years.
- * MC in boys
- * Chief complaint:
 - Fever
 - Respiratory distress
 - Stridor, wheezing
 - Cough *

* X-ray soft tissue neck, AP view will show
(mce) Steeple sign (narrowing of subglottis)

→ subglottis
→ trachea

* Rx:

- (1) Airway
- (2) Steroids
- (3) Bronchodilator:
eg: Salbutamol nebulisation
- (4) Antibiotics

(3) Juvenile papilloma of larynx

- * It is caused by HPV - 6, 11 (Human Papilloma Virus)
- * Source of infection is mother during birth (genital HPV in mother - warts)
- * Examination: Viral warts in larynx.
(Warts = Papilloma)
- * These warts can also spread to trachea, bronchi & lungs.
- * It is a premalignant condition (can cause laryngeal cancer)
- * Chief complaint:
 - Hoarse voice
 - Respiratory difficulty

* Rx:

- (1) CO₂ laser excision surgery

* Recurrence is very common.

Tuberculosis of larynx

- * Secondary to pulmonary TB
- * Posterior part of larynx in early stages (due to arytenoids)
- * And gradually it spreads anteriorly
- * It is a painful condition due to ulcer formation.
(Usually TB is painless)

* Symptoms:

- 1) Weakness of voice (mca)
- 2) Painful phonation

* Signs:

- 1) Mouse bitten appearance of vocal cord (mca)
- 2) Turban epiglottis (mca)

* Diagnosis:

∅/L + Biopsy

(∅/L → Direct laryngoscopy)

* Rx: ATT (Antitubercular ~~larynx~~ treatment) (therapy)

Lupus of larynx

- * No pulmonary TB
- * Involves anterior part of larynx in early stages
- * Painless condition
- * It is Atypical TB

Vocal nodules

- * Also called as Singer's nodule / Teacher's nodule. (mca)
- * Cause: Vocal abuse
- * Always bilateral
- * Site - Junction of anterior 1/3 & posterior 2/3 of vocal cord.



Because this is the most vibrating part of vocal cord.

* Chief complaint:-

- Hoarse voice

* Rx:

Voice rest / Speech therapy

* Also called as Screamer's nodule.

Vocal polyps

* Cause: Vocal abuse

* Unilateral

* Site - Ant. 1/3 & Post. 2/3 junction

* C/E: Hoarseness of voice
Diplophonia sometimes



(Patient can produce two different types of sound at the same time)

* Rx: MLS (micro laryngeal sx) followed by speech therapy

Intubation granuloma

* Cause: Faulty intubation (Iatrogenic)

* Site: Junction of ant. 2/3 & post 1/3 of vocal cord.

* Rx: Voice rest

Phonaesthesia

* Weakness of adductor muscles of vocal cord.

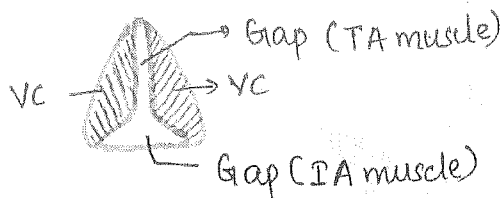
i.e., thyroarytenoid & interarytenoid muscles.



* Some gap will be left b/w vocal cords during phonation

↓
this gap looks like keyhole

↓
(MCR) called as keyhole glottis



* Rx: Speech therapy

Mogiophonia

* Speech problem in public appearance only.

(Mike - Mogiophonia)

* Rx: Behavioural therapy

Rhinolalia aperta aperta

* Hypernasality

* Seen in:

- Cleft palate
- Palatal perforation
- Palatal palsy

(Palate → Apelta)

Rhinolalia clausa clausa

* Hyponasality

* Seen in:

- Nasal polyp
- Adenoid hypertrophy
- Angiofibroma

Functional aphonia

* Also as hysterical aphonia

* Patient is pretending the symptoms of loss of voice

* Actually voice is normal (MCR)

* MC in young females (20 years)

(MCR) * Cough sound is normal and this proves the diagnosis

* On examination, vocal cord movements are normal.

* Rx: Psychiatric consultation

Cancer larynx

* MC in males, 40-60 years

* Risk factor:

- 1) Smoking
- 2) Alcohol

* It has 3 types:

- (1) Glottic cancer
- (2) Supraglottic cancer
- (3) Subglottic cancer

* Glottic cancer:

- Cancer of vocal cord
- It is the most common type of laryngeal cancer
- c/c: Hoarse voice
↓
∴ Detected earliest
- No neck node metastasis (no lymphatics)
- Good prognosis.

* Supraglottic cancer:

- Epiglottis is MC site
- c/c: Throat pain, dysphagia, feeling of lump in throat, hot potato voice
- Neck node metastasis are common (rich in lymphatics)

* Subglottic cancer:

- Very rare
- Stridor (MC)
- Investigations:
 - (1) D/L + Biopsy
(D/L - Direct laryngoscopy)
 - (2) CT scan of neck
 - Neck node staging (N)
 - Spread of tumour (T)
 - (3) X-ray chest:
 - To rule out distant metastasis (M)

↓
This gives TNM staging of tumour.

Tumour staging

- * T₁ → Only one structure involved
- * T₂ → More than 1 structure involved
- * T₃ → Vocal cord is fixed / immobile
- * T₄ → Invasion of thyroid cartilage or extralaryngeal extension.

Treatment

- * Carcinoma in situ of vocal cord (not yet started)

↓
Laser cordectomy >
stripping of VC mucosa

- * T₁ cancer:

CO₂ laser surgery > Radiotherapy

- * T₂ cancer:

Radiotherapy

- * T₃ & T₄ cancer:

Total laryngectomy

±
Radical neck dissection

↓
followed by radiotherapy

- * After total laryngectomy, patient has permanent tracheostomy.

↓
Cannot speak, cannot smell
(no nose breathing)

↓
cannot taste food properly
(half taste is via amma)

* Vocal rehabilitation after laryngectomy

↓
3 methods.

(1) Oesophageal voice:

- Difficult technique to learn
- Poor quality voice

(2) Electrolarynx / Artificial larynx:

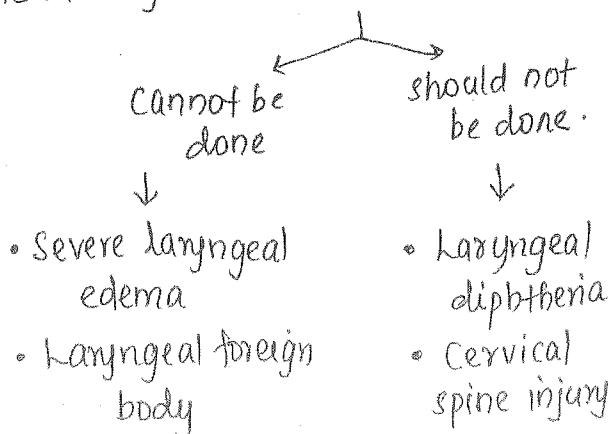
- Hand held, battery operated mechanical vibrator.

(3) Tracheo-oesophageal puncture device: (TEP device)

- Valve like device
- It is surgically fitted b/w trachea and oesophagus
- eg: Blom Singer prosthesis

Tracheostomy

* Its main indication is to secure the airway when intubation



mcq

* Tracheostomy reduces dead space by 50%. (dead space is from nose up to bronchi - no air exchange)

* Cuff of tracheostomy tube helps to decrease aspiration

↓
but this cuff can cause tracheomalacia

↓
- So high volume, low pressure cuffs are used.

- Deflate the cuff for 5 minutes every 2 hours.

mcq

* Level of tracheostomy is 2nd & 3rd tracheal ring

↓
we leave 1st ring to prevent any damage to larynx.

mcq

* High tracheostomy starts from 1st ring → done in cancer larynx

| Emergency tracheostomy | Elective tracheostomy |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Vertical skin incision• Quick• But scar is bad | <ul style="list-style-type: none">• Horizontal incision• More time• But better scar |

| Paediatric tracheostomy | Adult tracheostomy |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Soft trachea • A vertical incision on the trachea & tube is placed. | <ul style="list-style-type: none"> • Hard trachea • A circular portion of ant. tracheal wall is removed → tube is placed. |

* Complications of tracheostomy:

- (1) Surgical emphysema
Air in subcutaneous plane
- (2) Hemorrhage
- (3) Apnea
(due to CO₂ washout) (MCQ)
- (4) Pneumothorax
- MC in children
- Due to ~~the~~ high lung apex
- (5) Tube displacement
- MC in children
- (6) Tube blockage
(due to improper suction)
↓
remove the tube immediately and replace with new tube.
- (7) Tracheomalacia
- (8) Subglottic stenosis

* Tracheostomy is a temporary procedure except after the laryngectomy.

* The final removal of tracheostomy is called as Decanulation

↓
It is difficult process in the children (they may get adapted to it)

* Tracheostomy tubes:

- (1) PVC (Poly Vinyl Chloride)
 - Cuffed.
 - Uncuffed.

(2) Metallic:

eg: Chevalier Jackson tube

↓
It has an outertube & an inner tube

↓
Inner tube is longer

↓
To clean the tube only inner tube is removed, cleaned & replaced. Outer tube is left as such.

EAR

Embryology

1) Pinna:

- Tragus → First arch
- Rest of Pinna → 2nd arch.
- Insisura terminalis → junction of first arch & 2nd arch.



↓
mca It has no cartilage.

↓
If this union is incomplete

↓
lead to pre-auricular sinus

↙
If recurrent infection

↓
Excision

→
Asymptomatic

↓
No Rx

- Anotia : Absence of pinna
- Microtia : Small pinna
- A normal pinna has two curvatures (C-shaped)
 - Helix (large)
 - Antihelix (small)

mca • If Antihelix is absent, it is called BAT ear.

↓
Plastic reconstruction of pinna is done after 6 years of age.

↓
Because pinna grows to maximum size by this age.

- Pinna & Cochlea completes embryological development by 20th week.

2) Tympanic Membrane:

- Develops from all 3 layers
 - Ectoderm
 - Endoderm
 - Mesoderm

↓
• Tympanic membrane is made of 3 layers

- 1) Skin
- 2) Mucosa
- 3) Middle fibrous layer

3) Ossicles

* Malleus } Develops from the first arch

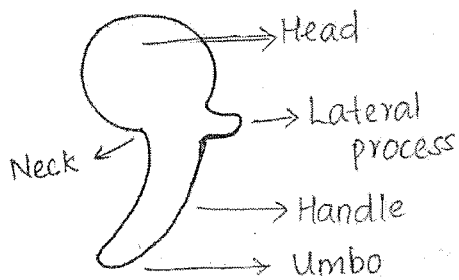
Incus }

* Stapes - from 2nd arch
(Stapes - Second arch)

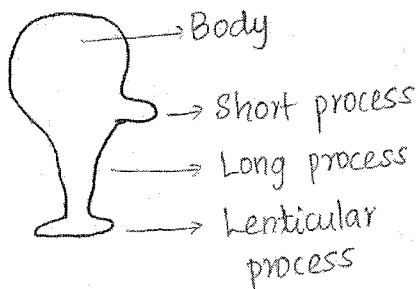
* Size : $M > I > S$

mca * Stapes is the smallest bone of the body.

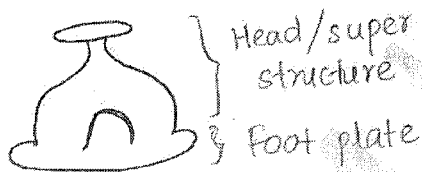
Malleus



Incus



Stapes



⇒ Foot plate is attached to the oval window of cochlea.

* stapes acts like a ~~piston~~ piston

↓
If this piston gets fixed, leads to

↓
Otosclerosis

MCS

3) Cochlea

* Develops from Otic capsule (Neuroectoderm)

* MCS

■ Middle ear, ossicles, cochlea

↓
are of adult size at birth
(don't grow after birth)

■ Mastoid tip is absent at birth, it develops by 2 years of age.
(M tip - prominent area in M)

PINNA

* Made of yellow elastic cartilage covered by skin.

* Skin is attached to pinna on lateral surface (lateral = front)

€ It is loose on medial surface (back)

* Nerve supply of pinna.

1) Greater auricular nerve

2) Lesser occipital nerve

3) Auriculo temporal nerve

4) Auricular branch of vagus

5) Sensory division of facial nerve.

* Greater auricular nerve supplies lobule (lower, soft, earing area)

* 3, 4, 5 → supplies external auditory canal (EAC)

* Boxer's ear / Cauliflower ear:

It is post traumatic deformity of pinna.

Cause: Trauma



Hematoma of pinna



Necrosis of cartilage

MCQ

∴ Pinna hematoma should be drained immediately.

External Auditory Canal (EAC)

- * It is 24 mm in length
- * Outer 8mm → Cartilaginous
- * Inner 16 mm → Bony
- * Bony EAC is made by the tympanic part of temporal bone
- * It is lined by skin.
- * Outer part of skin has hair follicles & ceruminous glands

↓ (wax)

Some people produce more wax



They can have blockage of EAC due to wax collection



MCQ

30 dB (decibel) hearing loss



Rx: Ear syringing

(water → ear → remove wax)



MCQ

Direction of water is posterosuperior.

* If there is live insect in EAC



MCQ

Put oil in EAC to kill it & then remove it.

* There are natural defense in EAC



In cartilaginous part

In bony part



MCQ

* /a fissure of Santorini

k/a fissure of Huschke

* Direction of EAC is :

Inward, downward forward

∴ During examination of ear, the pinna is pulled in upward outward backward direction.

* Nerve supply of EAC:

1) Auriculotemporal nerve (supplies anterior wall and roof of EAC)

2) Auricular branch of vagus

k/a Arnold's nerve or Aldermann's nerve.

(lies in posterior wall & floor of EAC)

↳ ~~Sensory~~ ↓

MCQ

stimulation of this nerve leads to cough

3) Sensory division of ^{facial} vagus nerve

(supplies posterosuperior part of EAC)



Loss of sensation in the posterosuperior part of EAC is a feature of Acoustic Neuroma (8th nerve tumour)



mca This sign is k/a Hitzelberger sign.

Diseases of EAC

1) Diffuse otitis externa:

* Infection of whole of skin of the EAC

mca * Also called as Tropical ear, Singapore ear, swimmer ear, telephone ear

2) Localized otitis externa:

* Also called Furunculosis

* Staphylococcal infection of hair follicle.

* Seen in the outer part of EAC

mca * Rx: DG packing in EAC
(Ichthammol Glycerine packy)

* 3) Malignant otitis externa: (full mca)

✓ * Infection of underlying bone ~~with~~ of EAC.

✓ * Also k/a Skull base osteomyelitis

✓ * Seen in elderly diabetics

✓ * Caused by Pseudomonas

✓ * clinical feature:

1) Severe ear ache

2) Granulations in EAC

3) Facial nerve is most commonly involved.

4) 9, 10, 11, 12 nerve palsy may or may not present

✓ * Investigation is

Tc bone scan (Tc:Technetium)

✓ * DOC: 3rd generation Cephalosporin

4) Otomycosis:

* It is fungal infection of EAC

mca * MC fungus is Aspergillus niger

mca * Examination:

Wet newspaper appearance

* Rx: Ear Toilet (cleaning)

+
Antifungal ear drops.

5) Exostosis

- MCS
- * Surfer ear
 - * Hyperplasia of bony EAC
 - * MC in water sports persons.



- * Rx: Canalplasty.

Tympanic Membrane

- * Also k/a Myring
- * It is a part of external ear
(Ext ear → Pinna, EAC, TM)
- * It is pearly grey/white in colour.
- * Oval in shape.
- * 9-10 mm in diameter
- * Surface area is 90 mm^2 .
- * Peripheral part is more mobile than central part.

- MCS
- * It lies at an angle of 55° with horizontal.

- * It shows 4 landmarks:
 - 1) Handle of Malleus
 - 2) Lateral process of malleus
 - 3) Cone of light.
 - 4) Umbo.

- * Cone of light → produced by reflection of light from handle of malleus. (otoscope light)

↓
In right ear it is at 5 o'clock
left ear - 7 o'clock.

- * It shows mobility on Seigelisation. (putting air pressure on tympanic membrane)

- * It has two parts

1) Pars tensa
• Has 3 layers

2) Pars flaccida
• Has 2 layers
(fibrous layer is absent)

- Also k/a Sharpnell's membrane.

MCS



Right TM

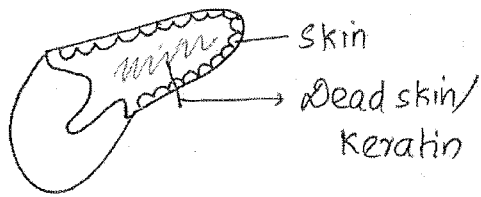
- Retracted TM: It is due to the eustachian tube blockage which produces negative pressure in Middle ear.

↓
TM gets sucked inside

- Dull in appearance
- Cone of light absent
- On Seigelisation, mobility is reduced or absent.

- Retracted Retraction Pocket

- Too much of retraction
- MC seen in pars flaccida
- It is lined by skin & filled by keratin (dead skin)



* Middle ear has 3 parts:

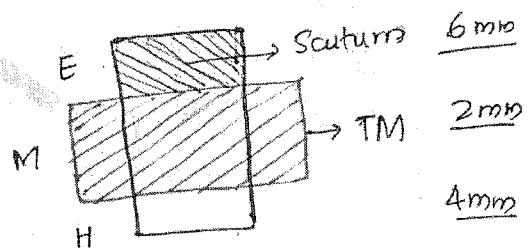
- 1) Epitympanum (= ATTIC)
- 2) Mesotympanum
- 3) Hypotympanum

* Mesotympanum (M) covered by TM

* Epi & Hypo are covered by the bone.

^{MCA} * The bone which covers attic is k/a Scutum.

(Attic = Epitympanum)



* Depth of 6mm, 2mm, 4mm (E, M, H) ^{b/w TM &}

* sensory supply:

↓
Tympanic branch of Glossopharyngeal nerve also k/a Jacobson's nerve

↓
This nerve is a cause of Referred otalgia i.e.

- Tonsillitis
- Tonsillectomy
- Cancer of base of tongue.

■ Myringitis bullosa:

* It is viral infection of TM (MCA)

* There are multiple vesicles on tympanic membrane (TM).

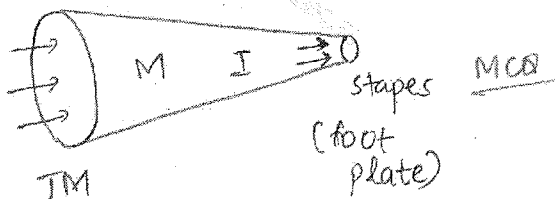
* It is self limiting condition

MIDDLE EAR

* Also k/a Tympanum

* TM + Ossicles works as one unit for the

- 1) Conduction of sound.
- 2) Amplification of sound (Impedance of matching)

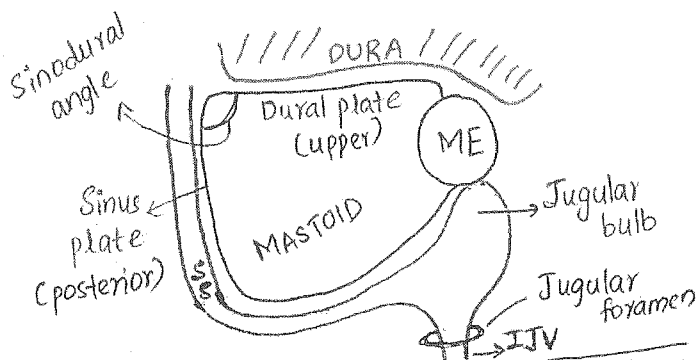


* Middle ear transformer ratio 18:1

(18 times difference in area of amplification of sound)

* 6 walls of middle ear:

- 1) Roof → Above roof lies dura of temporal lobe of brain.
- 2) Floor → Below the floor lies jugular bulb.



- SS - Sigmoid sinus / Lateral sinus
- Neck → below jugular foramen → internal jugular vein
- B/w dural plate & sinus plate Sinodural angle or Citelli's angle.

3) Anterior wall → It has 2 opening

- Lower: Eustachian tube (ET)

- Upper: Tensor tympani muscle (TT)

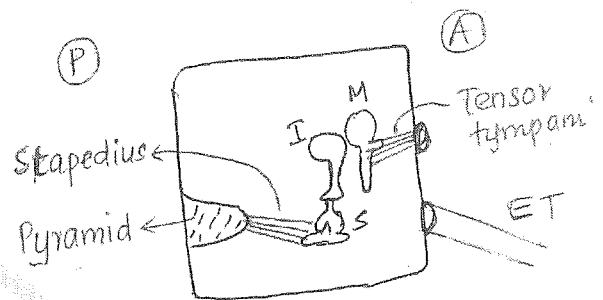
↓
(which attaches to Malleus)

↓
TT is supplied by mandibular division of Trigeminal nerve (TT-T)

4) Posterior wall → has projection called Pyramid (MC)

↓
from that Stapedius muscle comes out, which is present in stapes

↓
supplied by facial nerve



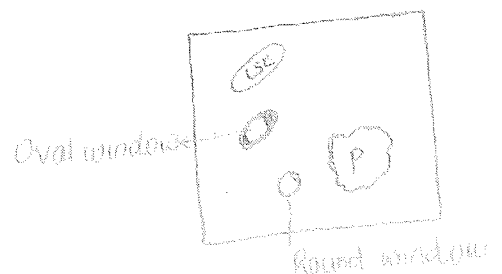
* Incus has no muscle, so it has least blood supply

↓
∴ MC eroded ossicle in the CSOM (middle ear infection)

5) Medial wall of ME

Behind this wall lies inner ear. So it has 2 projections of inner ear

- (i) Promontory (projection of basal turn of cochlea)
- (ii) Lateral semicircular canal bulge



* Has 2 windows for inner ear

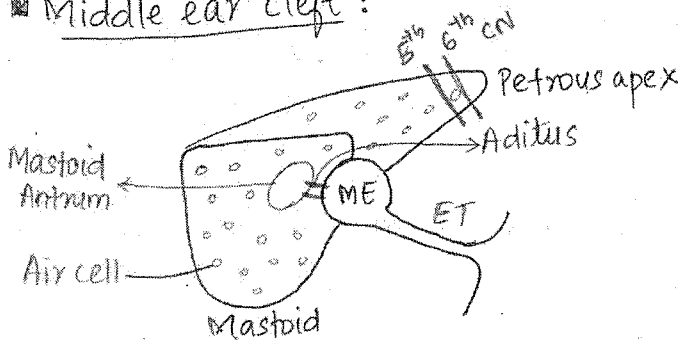
- 1) oval window (covered by stapes)
- 2) Round window (covered by round window membrane)

MCO

Also k/a secondary tympanic membrane.

6) Lateral wall.

■ Middle ear cleft:



* Middle ear cleft has 5 parts

- 1) ET (Eustachian tube)
- 2) ME (Middle Ear)
- 3) Aditus (connects Antrum to middle ear)
- 4) Mastoid Antrum (most constant & largest, ~~cont~~ mastoid air cell)
- 5) Rest of air cell.

* At petrous area has 5th & 6th CN

■ Diseases of Middle Ear cleft

1) ASOM

- * Acute Suppurative Otitis media
- * It is infection of middle ear mucosa by pyogenic organism.
- * MC - Streptococcus pneumoniae
- * C/C - Earache
- * Examination → Red TM with dilated capillaries

k/a Cart wheel appearance



* Rx → Medical management



• If a person of ASOM has MCO red, bulging TM (ie, pus)



Rx: Myringotomy



MCO It is done in posteroinferior quadrant.

- A person with ASOM with perforation → if took Rx → it will heal → healed perforation
- If no Rx of 3 months → skin will form on margin → permanent perforation → converts to ~~mean~~ safe CSOM (chronic)



↓
Perforation persists until we do surgery.

2) Acute mastoiditis

- * It is infection of mastoid air cells
- * It is a complication of ASOM or CSOM

- * C/c: Pain behind the ear;
Fever, ~~perforated ear~~
~~dis.~~ profuse ear discharge
(every air cells produce pus)

* Signs

- mca
- First sign is ironing of mastoid surface
(smooth & shining appearance)
 - Mastoid tenderness +ve
(press → pain)
 - Pus keeps flowing from mastoid to middle ear.

On cleaning the middle ear, pus fills again

Reservoir sign

The pus column keeps moving

Light house sign

(as pus moves, otoscope light also moves)

* Rx: Surgery → Cortical mastoidectomy

or
Schwartz operation

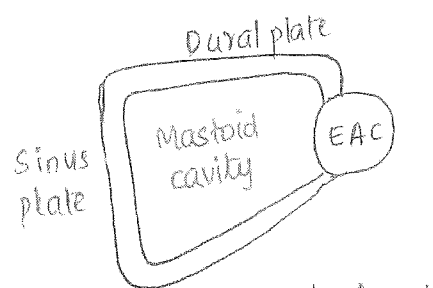
mca
* First step of any mastoid Sx is finding the mastoid antrum

↓
Surgical landmark for antrum is McEvan's triangle / Suprameatal triangle.



* Korner septum

- * Found in some people
- * Remnant of petrosquamous suture.
- * It leads to difficulty in finding the antrum.



Cortical mastoidectomy

3) Petrositis

mca * Also k/a Gradenigo syndrome

- * It is infection of petrous apex air cells
- * It is a complication of ASOM or CSOM
- * 5th & 6th CN passes petrous apex

* C/P of Gradenigo syndrome:

- 1) Ear discharge
- 2) Retroorbital pain (5th)
- 3) Diplopia (6th CN)

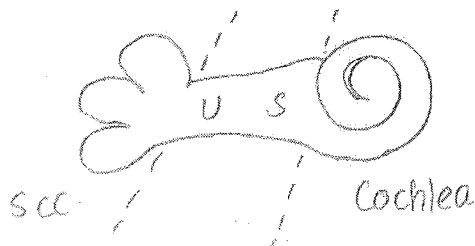
* Rx: Surgical management.

Eustachian tube:

- * 36 mm in length (MCA)
- * Outer 12 mm is bony
- * Inner 24 mm is cartilagenous
- * At birth, it is a horizontal tube
- * In adults, it has 45° angle with the horizontal.
- * Eustachian tube opens in nasopharynx
- * It opens 1.25 cm behind the posterior end of inferior turbinate
- * ^{Mus} Tensor palati muscle opens the tube ~~when~~ while swallowing.

INNER EAR (Imp)

- * Also k/a Labyrinth
- * 2 parts:
 - Membranous labyrinth
 - Bony labyrinth.
- * Membranous labyrinth is actual inner ear
- * Bony labyrinth is the ^{bony} body cover



* 3 parts

- 1) Cochlea
- 2) Utricle & Sacculle
- 3) Semicircular canal

- * Cochlea → hearing
- * U & S → Linear balance
- * Canal → Angular balance
- * ~~Cochlea has Organ of Corti~~
- * Every part has sensory end organ
 - * Cochlea → Organ of Corti
 - * U & S - Macula
 - * SCC - Crista

* Fluids of inner ear:

- * Inner ear is filled with Endolymph
- * It is surrounded by Perilymph

Endolymph (All MCAs)

- ✓ * Produced by stria vascularis of Cochlea
- ✓ * Absorbed by endolymphatic sac
- ✓ * Continuous production & absorption
- ✓ * If endolymphatic sac does not absorb properly, leads to

↓
Menier's disease

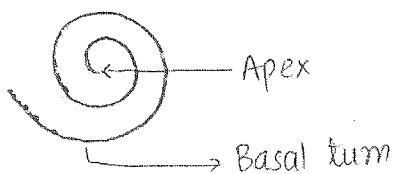
↓
causes cochlear damage due to high endolymph pressure

Perilymph

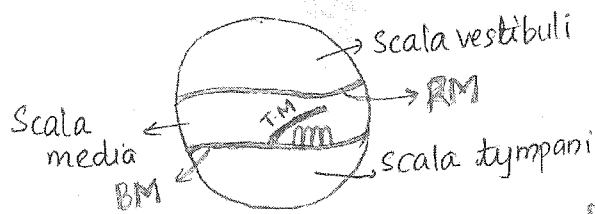
- * It is equal to CSF
 - * CSF is connected to perilymph via Aqueduct of Cochlea.
- ↓
- can cause post meningitic deafness (through CSF reach IE)

Cochlea

- * Has $2\frac{3}{4}$ turns



- * Apex also k/a Helicotrema.
- * Basal turn senses high frequency sound.
- * Apex senses low frequency sound.



Cutsection of Cochlea

- * Reissner's membrane b/w SV & SM
- * Basilar membrane b/w SM & ST
- * Basilar membrane has Organ of Corti
- * Pectorial membrane covers organ of Corti.
- * Endolymph → in SM
- * Perilymph → in SV, ST

Utricle & Sacule

- * Also k/a Vestibule or Otolithic organs.
- * Helps in linear balance.
- * Sacule controls vertical ^{linear} movement
- * Utricle controls horizontal linear movement.
- * Sacule is connected to cochlea via Ductus Reuniens.

Macula

- * It is the sensory end organ of Utricle & Sacule.
- * It is surrounded by a gelatinous layer which has CaCO_3 crystals k/a Otoconia / Otolith
- * 2 macula → ¹ in Utricle & ¹ in sacule

- * Otoconia / Otolith → if they turn free and reach semi-circular canal → leads to Vertigo (めまい) → this disease is called BPPV

BPPV

- * Benign Paroxysmal Positional Vertigo.
- * Cause: displaced otoconia
- * MC otoconia reaches posterior semi circular canal.

* c/c : Vertigo for few seconds on changing head position

* Diagnostic procedure:

Dix-Hallpike maneuver.

(Nystagmus - jerky movement of eye) (when head turn to side & suddenly down)
in diseased person

* Rx: Epley's maneuver.

* BPPV is the MCC of peripheral vertigo / Vertigo (ear related)

* Central Vertigo is very rare.

Semicircular canal

1) Lateral / Horizontal SCC

2) Posterior SCC.

3) Superior SCC.

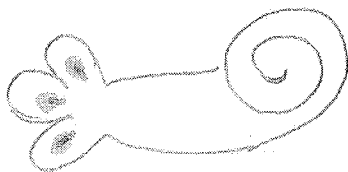
* 3 canals have 5 openings, because one limb of posterior mca and superior canal is fused.

↓
fusion k/a Crus commune

Crista

* It is the sensory end organ of SCC

* It is surrounded by a gelatinous mca layer which is k/a Cupula



Bithermal caloric test

* Test for only lateral SCC

* Steps:

- Patient is ~~held~~ made to lie supine with head tilted to 30°.
- EAC is irrigated with warm (44°C) & cold (30°C) water.

↓

Produces Nystagmus in the normal people

* Direction of Nystagmus - COWS

- Cold H₂O → Eyes move to opposite side
- Warm H₂O → Eyes move to same side

(right ear H₂O → right side eye movement)

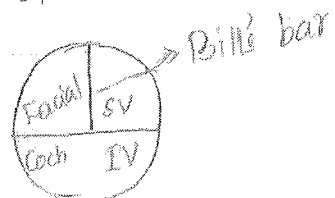
Internal Auditory Canal (IAC)

* 7th & 8th CN pass through IAC to enter the ear.

* 8th CN is made of 3 divisions:

- 1) ~~Superior~~ vestibular division
- 2) Inferior vestibular division
- 3) Cochlear division

* Cut section of IAC:



* Bills bar is the vertical bony septum in upper part of PAC

Tuning fork test

^{MCQ} * MC used tuning fork is 512 Hz.
↓
Good sound & less vibration.

Audiology

* Hearing loss - 2 types:

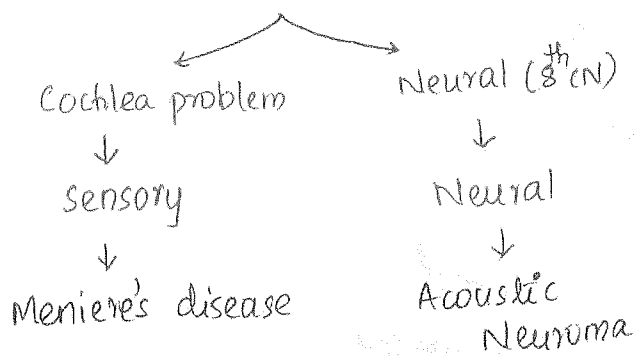
- 1) Conductive hearing loss (CHL)
- 2) Sensory neural hearing loss (SNHL)

* 3 tests to do:

* CHL: Any problem from pinna to stapes.

eg: Wax, CSOM, Glue ear, Otosclerosis,

* SNHL: Any problem in inner ear & 8th CN.



* We can hear sound in 2 ways

1) Air conduction (AC)

* Natural way of hearing

2) Bone conduction (BC)

• Directly reaches cochlea

• So it checks cochlea only

^{MCQ} • Thus it is poor in SNHL only

| Test | Normal | CHL | SNHL |
|---------|-----------------------|-----------------|-------------------|
| • Rinne | AC > BC +ve | BC > AC -ve | AC > BC +ve |
| • Weber | In centre of forehead | In the poor ear | In the better ear |
| • ABC | Equal | Equal | ↓↓ |

* ABC - Absolute bone conduction

* Rinne → tuning fork → best heard in mastoid & in air

* Weber → tuning fork at forehead → heard sound where?

* ABC poor only in SNHL

* False -ve Rinne in unilateral severe SNHL

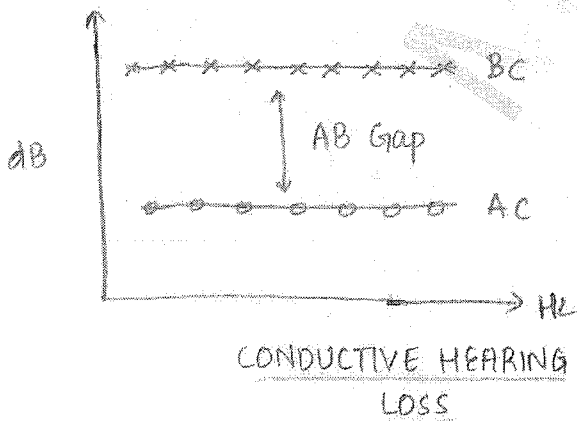
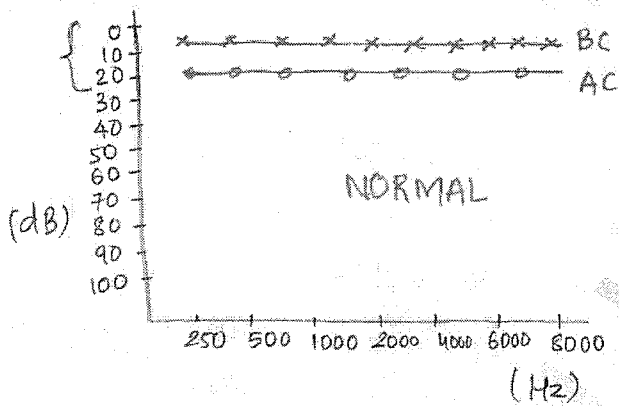
↓
It is due to transcranial transmission of sound to other side cochlea when bone conduction is been checked on diseased side

⇒ **MCQ Tip**: If Rinne is given -ve and Weber is heard in better ear. Then Ans: is unilateral severe SNHL

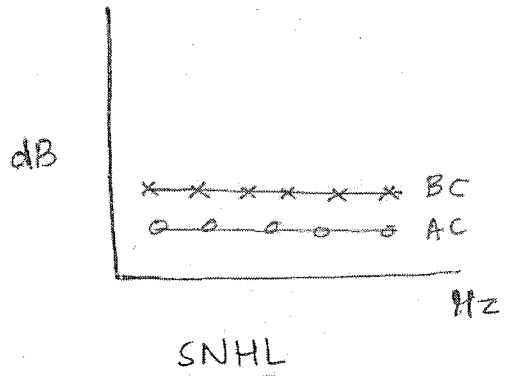
- * Gelle's test \rightarrow It is a tuning fork test. It was used in the past to diagnose Otosclerosis.

Pure tone audiometry (PTA)

- * Also k/a Audiogram
- * It is a subjective test of hearing
- * PTA calculates level of hearing of both ears of patient on different frequencies from 250-8000 Hz in AC & BC both.



- * BC Normal
- * AC poor
- * AB gap present



- * Both AC & BC are poor (Cochlea damaged)

Basic rules

- * Red line for right ear
- * Blue line for left ear
- * BC \rightarrow Open mouth symbols $\langle \rangle, []$
- * AC \rightarrow closed mouth symbols O, Δ, \square, X

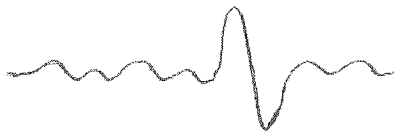
BERA

- * ^{MLR} Brain stem Evoked Response Audiometry
- * Used for children
- * It is an objective test of hearing
- * Principle

We give sound to ear
 \downarrow
 we record electrical activity from auditory pathway in brain stem area.

Auditory Pathway

- E - Eighth nerve
- C - cochlear nucleus
- O - Olivary Complex Superior
- L - Lateral lamniscus
- I - Inferior colliculus.



Wave V

* Wave V is produced by lateral lamniscus.

Uses of BERA

- 1) Paediatric patients
- 2) Malingerers (to check tells lie abt loss of hearing or not)

OAE

* Oto acoustic emission

* Principle: when we give sound to healthy cochlea

↓
 MCA it produces echoes from outer hair cells *

↓
 These echoes are k/a OAE

MCA * OAE is the ideal hearing screening investigation.

Tympanometry

Part A Part B

↓ ↓

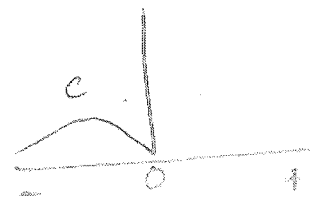
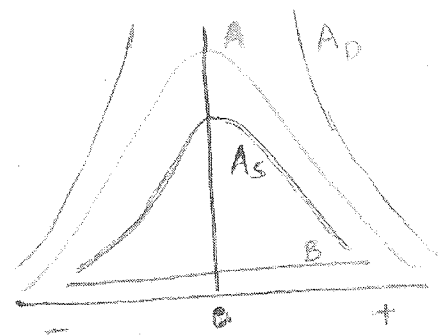
This test checks freedom of movements in the TM & ossicles in change of air pressure

stapedial reflex

Part A

* Shows 5 types of curve

- A - Normal
- B - Glue ear
- A_s - Otosclerosis
- A_D - Ossicle dislocation
- C - Retracted TM / Eustachian tube blockage



- * Type c is only on -ve side
- * Type B is flat curve.
- * In tympanic membrane perforation, can't change pressure → so type B

Part B

- * It is stapedial reflex
- * Principle: On hearing loud sound mca stapedius contracts, to protect the inner ear.

(stapedius → stapes a little away from oval window → so all sound not going to inner ear)

- * Stapedial reflex:
 - Afferent: 8th CN
 - Efferent: 7th CN

- * This reflex is absent in
 - 1) Deaf patients (no 8th CN)
 - 2) Facial palsy (no 7th CN)
 - 3) Otosclerosis

Age induced hearing loss

- * Also k/a Presbycusis
- * It causes high frequency hearing loss in early stages.
- * Rx: Hearing aid

Noise induced hearing loss

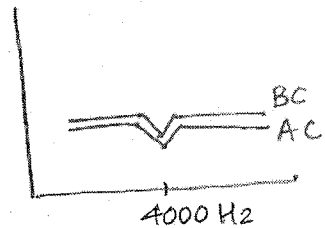
- * It is an occupational disorder
- * Permissible level of noise in industry is 90 dB (or 85 dB) 8 hrs a day or 5 days a week mca (85 dB > 90 dB)

* PTA here shows

(Pure tone audiometry)

- * Dip at 4000 Hz in AC & BC

mca



Drug induced hearing loss

- * Ototoxicity

List of drugs

1) Aminoglycosides

- Amikacin
- Gentamicin
- Streptomycin

2) Diuretics:

- ~~Furo~~ Furosemide
- Ethacrynic acid

3) Antimalarial

- Chloroquine
- Quinine

4) NSAIDs

- Aspirin
- Ibuprofen
- Indomethacin

5) Anticancer drugs

- Cisplatin
- Carboplatin

- 6) Desferroxamine (in thalasemia)
- 7) Erythromycin
- 8) Vancomycin

* Drugs cause high frequency hearing loss in early stages.

* So high frequency audiometry is MCA used to diagnose ~~auto-toxicity~~ ototoxicity.

MCA ⇒ Temporal bone # in head injuries can lead to ossicle dislocation with normal TM → 54 dB^{loss}, CHL

MCA ⇒ If ossicle dislocation with perforated TM → 38 dB^{loss}, CHL
(through perforated hole, some sound reaches cochlea)

MCA ⇒ Temporal bone # in head injury can cause facial palsy. It is of 2 types

MCA 1) Immediate onset - due to injury to nerve at # line

Rx: Immediate Sx

MCA 2) Delayed onset - edema of nerve due to # line.

Rx: Steroids

GLUE EAR (Important)

* Also k/a Serous Otitis media or secretory otitis media

* It is collection of thick, sterile, glue like fluid in middle ear

* MCA is Adenoid Hypertrophy blocking eustachian tube opening.

* Rare cause is nasopharyngeal cancer.

* C/c: In school going child:

- 1) Dull heaviness in ear (painless)
- 2) Hearing loss
- 3) Poor school performance

* Investigation

(i) PTA (Poor tone Audiometry)

MCA CHL, 10-40 dB hearing loss

(ii) Tympanometry:

B (flat) curve

* Rx: Myringotomy (incision in TM) in the anteroinferior quadrant

(But in ASOM - posteroinferior quad^y)

+ Grommet insertion

(middle ear ventilation tube)

± Adenoidectomy.

Barotrauma of Ear

(descent of flight)

* Also k/a Aero-otitis media ^{of flight}

* Low to high pressure while landing

* Eustachian tube fails to open

up → sudden retraction of TM

→ severe ear ache

* Rx: Valsalva

(forceful expiration with closed nose & closed mouth)

↓
If fails: Myringotomy + Grommet insertion

Safe CSOM

- * Also k/a Tubotympanic CSOM
- * Presence of permanent central perforation in pars tensa of TM.
- * Central means there is TM margin all around perforation.
- * It is the sequelae of ASOM with perforation.

* C/P: (i) Ear discharge (which is mucopurulent, not foul smelling, Not blood stained)

(ii) Hearing loss (In CSOM, ossicles also get eroded \rightarrow MC is incus, particularly lenticular process of incus)

* Investigation: PTA \rightarrow CHL ^(conductive hearing loss)
(Pure tone audiometry)

* Rx: Surgery

1) Myringoplasty (repair of TM perforation using a graft)

- MC used graft is temporalis fascia.
- MC used technique is underlay technique.

2) Tympanoplasty - inspection & repair of TM & ossicles in addition to Myringoplasty.

■ What is type III tympanoplasty?

Ossicle inspection shows $M^- I^- S^+$ (M eroded, I eroded, stapes normal)

\downarrow

TM graft is placed over stapes

\downarrow

MC Also k/a Myringostapediopexy or Columella tympanoplasty

3) Artificial ossicles

* Also k/a Ossicular replacement prosthesis (ORP)

MC * Made of Titanium or Teflon

* It is of 2 types:

1) Partial ORP (PORP)

2) Total ORP (TORP)

* Partial used in $M^- I^- S^+$ situation

* TORP used in ~~MC~~ $M^- I^- S^-$ _{head}

(Only foot plate of stapes left)

Unsafe CSOM

* Also k/a Attico antral CSOM

* It is characterised by the presence of cholesteatoma. *

* Cholesteatoma is presence of skin in middle ear cavity.

MC * It is pearly white in colour

Origin of cholesteatoma

1) Congenital

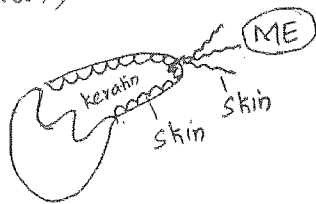
MCA

Pearly white mass behind the intact TM.

2) Primary acquired cholesteatoma

MCA

- Due to retraction pockets (CRP-lined by skin & filled by keratin)

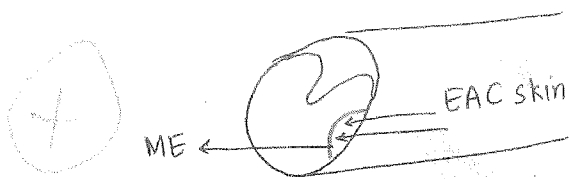


MCA

- This is the MC origin of cholesteatoma.

3) Secondary acquired cholesteatoma

- due to marginal perforations



- EAC skin grows in to the middle ear along absent margin.

MCA's

⊗ Retraction pockets are the MCC of cholesteatoma formation

⊗ MC site of cholesteatoma → Prussak's space in epitympanum

↓
lies b/w pars flaccida & neck of the malleus

• Why cholesteatoma is unsafe?

Due to bone eroding properties; which is a complication of unsafe CSOM.

• why so?

Skin should be communicating to outside world, as it is continuously shedding off.

↓
Middle ear cleft is a closed space ∴ This skin in middle ear cleft forms a skin lined, keratin filled expansile sac.

↓
this sac eroded surrounding bones.

* C/F:

1) Ear discharge - scanty, foul smelling (due to bone erosion), blood stained (due to the granulation formation)

2) Hearing loss

* Investigation:

1) PTA (Pure Tone Audiometry)

2) X-ray mastoid (to look for bone erosion)

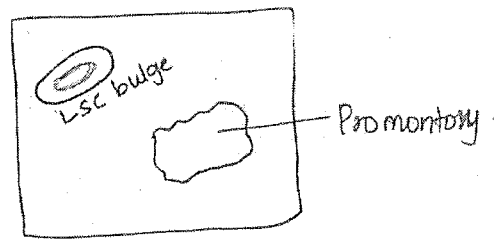
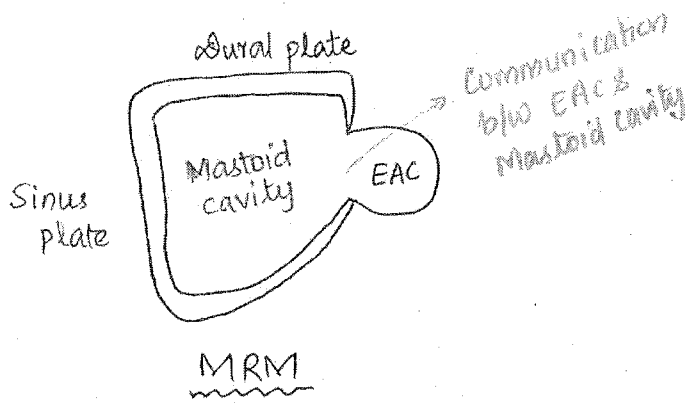
- Schuller's view

- Towne's view

* Rx: Surgery - MRM (modified radical mastoidectomy)

↓
Also k/a mastoid exploration.

NICE • Main aim of MRM - to make ear safe.



* Complications of unsafe CSOM:

(A) Extracranial complications

- Mastoiditis
- Abscess formation
- Facial palsy
- Labyrinthine fistula
- Petrositis (Gradenigo syndrome)

⇒ Abscess formation in CSOM in Mastoiditis:

- 1) Mastoid abscess (post auricular)
- 2) LUC's abscess (in EAC)
- 3) Bezold's abscess (along SCM)
- 4) Citelli's abscess (along digastric muscle)

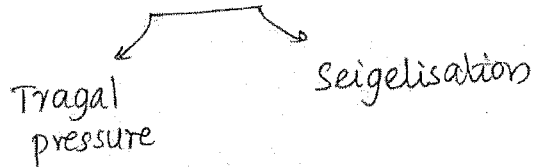
(SCM: Sternocleidomastoid muscle)

⇒ Mastoid abscess is the commonest site. (MCA)

⇒ Labyrinthine fistula:

- It is erosion of bony cover of LSC bulge (lateral semicircular canal) on medial wall of middle ear.
- It is due to bone eroding properties of cholesteatoma.
- C/P: Vertigo.

• Fistula sign +ve



MCA False +ve fistula sign (no fistula) (or Heinnebeit sign) seen in Congenital syphilis

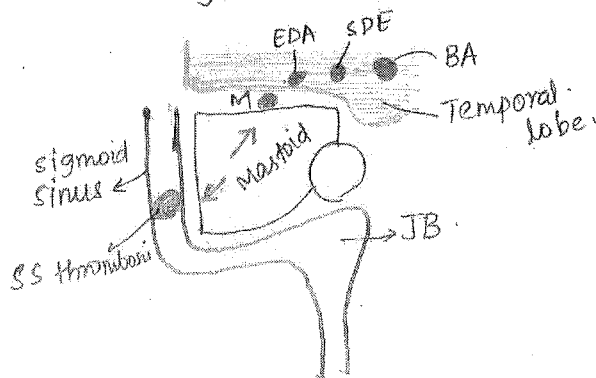
MCA False -ve fistula sign (has fistula) seen in

- Fistula in dead labyrinth
- Fistula covered by cholesteatoma.

(True -ve fistula sign in Normal)

(B) ~~Ex~~ Intracranial complication

- Meningitis
- Extradural abscess
- Subdural empyema
- Brain abscess
- Sigmoid sinus thrombosis



MCQs

- * MC complication of CSOM
Mastoiditis
- * MC intracranial complicatⁿ of CSOM
meningitis
- * MC site of brain abscess in CSOM
Temporal lobe

Sigmoid sinus thrombosis

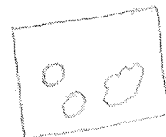
- * Also k/a lateral sinus thrombosis
- * Fever (spiky & with rigors & chills)
k/a Picket Fence fever
(pus inside - causes fever)
- * Has pitting edema over mastoid
MS k/a Griessenger sign
- * No change in CSF pressure on
pressing IJV (int. jugular vein)
- * It can be seen in 2 ways
 - 1) Lumbar puncture
Tobey Ayer test
 - 2) Fundus examination
Crowe beck test
- * CT brain will show delta sign
- * Rx: ~~MRM~~ MRM + Open sinus
plate & clear thrombus.

MCQs

- * Unsafe CSOM → do MRM
- * Unsafe CSOM + Complication
→ MRM
(MRM also k/a mastoid exploration)
- ↳ except in 2 situations
 - (i) Subdural empyema
 - (ii) Brain abscess} Rx. Neuro surgery.

Otosclerosis (important)

- * Also k/a Otospongiosis
- * Fixation of stapes foot plate
- * MC in young females in 2nd-3rd
decade
- * It is genetic disease (autosomal
dominant)
- * It is a bilateral disease
- * Gradually progressive disease
but pregnancy can aggravate it
- * MC site of origin is a point
anterior to oval window.
↓
point is k/a Fissula ante fenestrum
- * Disease focus is pink in colour
in early stages. It gradually
turns white.
- * Over next few years, the disease
surround the foot plate from
all around.



* C/F: Young ♀, bilateral gradually

1) progressive CHL

2) Patient can hear better in noisy areas - k/a as

Paracusis Willisii

MCB

* Examination of ear:

• 90% pt → Normal TM

• 10% pt → Schwartz sign +ve

↓
(in early stage of disease)

↓
It is Flamingo pink appearance behind TM

* Investigation:

1) PTA → shows CHL
→ Dip at 2000 Hz in BC called as Carhart's notch

(dip at 4000 Hz → Noise induced hearing loss)

2) Tympanometry - As curve + Absent stapedial reflex.

* Rx: Surgery → Stapedotomy > Stapedectomy

↓
In this surgery, fixed stapes is replaced with an artificial piston made of Titanium or Teflon (question mark shape)



* Other Rx:

1) Hearing aid (for pt unwilling for surgery)

2) ~~NaCN~~ NaF (sodium fluoride)

RxOC for Schwartz sign +ve patients (ie, early stage)

↓
leads to stabilisation of disease (ie, stops)

■ Van der Hoeve Syndrome:

- Otosclerosis

- Osteogenesis imperfecta

- Blue sclera.

Acoustic Neuroma (Important)

* Also k/a Vestibular Schwannoma

* It is benign tumour of 8th CN

* MC site → Inferior vestibular division of 8th CN.

* Brain tumour

* MC type of cerebellopontine angle brain tumour.

* Mostly unilateral except in Neurona fibroma type II

* C/F: Unilateral, gradually

① progressive SNHL with tinnitus (ringing in ear)

② Imbalance.

* First nerve involved in this tumour
mca is Trigeminal nerve

↓
mca leads to absent corneal reflex
(first sign)

* Sensory division of facial nerve is also involved.

↓
leads to Hitzelberger sign

↓
(loss of sensation in the posterosuperior part of EAC)
EAC

* Investigation:

1) PTA : U/L SNHL

mca 2) Roll over phenomenon +ve

↓
When intensity of sound is ↑
the understanding of words
even further falls down.

3) Gadolinium enhanced MRI
(Best Radiological Investigation)

* Rx : Surgery

Menier's disease (important)

* Also k/a endolymphatic hydrops
* It is rise in endolymph volume
due to faulty reabsorption by
endolymphatic sac.

* Mostly unilateral

* 3rd - 4th decade, ♂ > ♀

* Cause: Unknown

* c/f → Episodic disease → each
episode has tinnitus, vertigo
with nausea & vomiting &
hearing loss.

* Episode finishes within 24 hrs.

* Menier's is a cause of
mca fluctuating hearing loss

* Does not like noisy area due
mca to recruitment phenomenon.

↓
Abnormal perception of loudness

* Can have vertigo on hearing
loud sound k/a Tullio's
phenomenon.

* This patient can hear same sound
in 2 different frequencies k/a
mca Diplacusis

* Investigation:

mca 1) PTA → low frequency hearing
loss in early stages

2) Electrocochleography
Special investigation
used to diagnose Menier's disease

* Rx:

1) Antivertigo drugs during
episodes
2) Acetazolamides (diuretics)
in b/w episode.

↓
If no improvement seen then

↓

↓

1) Endolymphatic sac decompression surgery.

MCA

Donaldson's line is a surgical landmark for endolymphatic sac

(to improve reabsorption)

2) Trans tympanic injection of Gentamicin (to kill inner ear)

(done if patient requests)

Glomus Jugulare (Important)

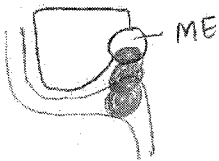
* It is a benign but locally invasive,

* highly vascular tumour arising from glomus cells lying around jugular bulb area

* MC in females

MCA * C/P: Female with pulsatile tinnitus

* It can invade hypotympanum



MCA * Tumour erodes the floor of middle ear & grows in to hypotympanum.

↓
k/a Rising Sun sign

* It erodes TM & grows in to EAC as red bleeding mass.

* This mass blanches on MCA Seigelisation k/a Brown sign

* CF scan will show Phelp sign

(It is erosion of bony septum b/w carotid canal and jugular foramen)

* C/C: Female pt with something pulsating / bleeding in the ear.

* Rx: Surgery.

FACIAL NERVE

* It enters the ear through the internal auditory canal.

MCA * In the ear it passes through a bony canal k/a

Fallopian canal / Facial nerve canal

* It comes out of the ear through styloid mastoid foramen.

* Facial nerve canal has 3 sections

1) Labyrinthine segment

MCA • It is the narrowest segment.

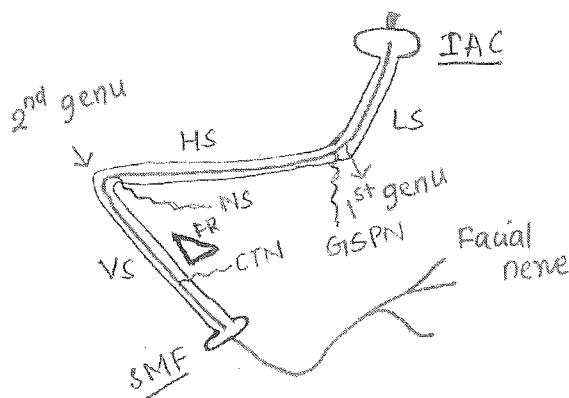
MCA • So called as bottle neck of facial nerve

2) Horizontal segment / Tympanic segment

3) Vertical segment / Mastoid segment

MLB

MC injured segment in mastoid surgery.



* Genu → Bend (1st & 2nd genu)

* It gives 3 branches in ear

(1) Greater superficial petrosal nerve (from 1st genu)

↓
Supplies lacrimal gland

↓
Name of test: Schirmer's test

(Test of lacrimation)

(2) Nerve to stapedius (from 2nd genu)

• Name of test is -

Stapedial reflex

(On hearing loud sound, stapedius contract)

(3) Chorda tympani nerve

• Supplies taste sensations to ant. 2/3 of tongue.

* Boundaries of Facial recess.

1) Chorda tympani

2) Vertical segment of facial nerve

3) Short process of incus.

Facial nerve disorders

■ Bell's Palsy (important)

* It is idiopathic, sudden onset lower motor neuron facial paralysis.

* It is mostly unilateral

* Recent studies have shown some role of Herpes Simplex Virus in its etiology

↓
causes edema of nerve.

* C/F:

MLB

⇒ Forehead muscle are also paralysed.

(because it is lower motor neuron type palsy)

MLB ⇒ Patient complaints of hyperacusis (sound) due to loss of stapedial reflex.

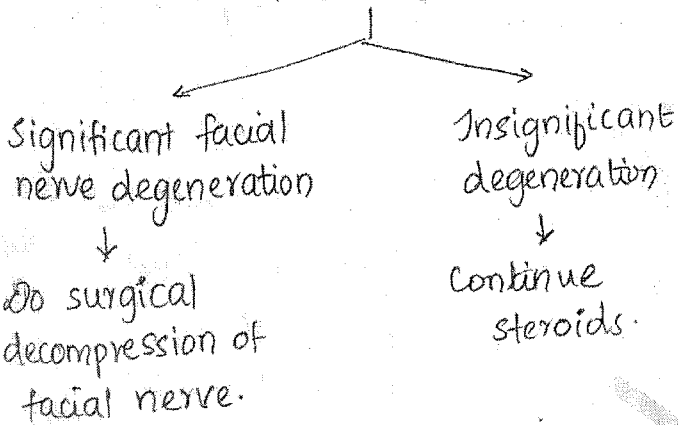
* Rx: Oral steroids for 3 weeks

* Other Rx: Acyclovir (if patient comes within 3 days of onset)

2) Artificial tear drops to prevent exposure keratitis (corneal problem due to dryness)

* Facial recovery is seen in 85% cases. (nearly universal)

MCA
* Cases which do not show recovery after steroid Rx → we do Electrophysiological nerve testing



MCA (Important) (Already asked)

- * Hyperacusis → Bell's palsy
- * Diplacusis → Meniere's disease
- * Paracusis Willisii → Otosclerosis
- * Presbycusis → Age related hearing loss.

Herpes Zoster Oticus

* Or Ramsay Hunt Syndrome.

* C/P:

- (1) Painful vesicles on pinna & EAC
- (2) Lower motor neuron facial palsy (7th)
- (3) ± Vertigo, SNHL (due to 8th CN involvement)
- (4) ± Anesthesia of face (5th CN involvement)

MCA

⇒ 7th CN ± 8 ± 5

* DOC: Acyclovir

* Facial recovery is seen in 50% cases only.

Temporal bone #

↓
Facial palsy

Delayed
Immediate onset

↓
Due to edema of nerve due to #

MCA

↓
Rx. - Steroids

Immediate
onset

↓
It is due to direct injury to facial nerve by # line (cut)

MCA

↓
Rx. - Immediate surgery.

Bilateral facial paralysis

* Causes are:

- 1) Sarcoidosis
- 2) Infection mononucleosis
- 3) Guillain Barre syndrome
- 4) Lyme disease.
- 5) Diabetes.

Melkerrson Rosenthal syndrome

- * Recurrent facial paralysis
- * Fissured tongue
- * Swelling of lips.

HEARING AID

* It is a device that amplifies sound.

* It has 4 parts:

- 1) Microphone (converts sound to current)
- 2) Amplifier (amplifies current)
- 3) Receiver (converts current to sound)
- 4) Battery.

* Hearing aids are not of much use for profound hearing loss patient i.e. more than 90 decibel hearing loss.

* For profound hearing loss we have cochlear implant surgery.

Hearing loss

- Mild \rightarrow 26-40 DB (decibel)
- Moderate \rightarrow 41-55 DB
- Moderately severe \rightarrow 56-70 DB
- Severe \rightarrow 71-90 DB
- Profound \rightarrow $>$ 90 DB

COCHLEAR IMPLANT

* It does direct electrical stimulation of cochlear nerve endings.


* Indications:

- 1) Bilateral profound hearing loss ($>$ 90 DB)

* Pre-requisite for cochlear implant is Normal 8th CN.

* It has two components

a) External \rightarrow It has 4 parts

- 1) microphone
- 2) ~~Amplifier~~ Speech processor
- 3) Transmitter \rightarrow 
- 4) Battery

b) Internal component has only one part -

Electrode / Receiver / stimulator.

\downarrow
Electrode is surgically placed in scala tympani of cochlea

\downarrow
It is placed through round window membrane.

- * Cochlear implant surgery is followed by speech therapy.

AUDITORY BRAIN STEM IMPLANT (ABI)

- * This implant does electrical stimulation of auditory pathway which lies in brainstem area.

* Indications:

- MCA - Neuro fibroma type II
↓
Bilateral Acoustic Neuroma (8th CN damage)

(for cochlea implant we need normal 8th CN)

- MCA * Site : Placed at lateral recess of 4th ventricle.

(should be away from medulla)

ORAL CAVITY & PHARYNX

Pre-malignant conditions of Oral cavity

- 1) Leukoplakia
- 2) Erythroplakia
- 3) Oral submucous fibrosis
- 4) Lichen planus.

- * MC is leukoplakia

Oral submucous fibrosis

- * Fibrosis in submucosal layer of oral cavity.

- * Very common in India

- * Cause: Chewing of Betel nut & Tobacco

- * C/c :

- Soreness of mouth

- Trismus (difficulty in opening mouth)

- * It is pre-malignant condition

- * Rx :- Stop the irritant

- Oral injections of Dexamethasone + Hyaluronidase (to dissolve fibrosis)

MCA

- * MC site to develop oral cavity cancer is

Lateral border of tongue

MCA

- * MC site of oral cavity (a in India)

Gingivo buccal sulcus

(buccal mucosa)

MCA

⇒ Reverse smoking (Chutta) is a risk factor for (burning end inside mouth)

MCA

Hard palate carcinoma

⇒ Commando's operation:

It is combined oromandibular resection with radical neck dissection

↓

This is done for oral cavity cancer with mandibular involvement.

MCA

⇒ Fordyce spot

It is ectopic presence of sebaceous gland in buccal mucosa.

MCA

⇒ Ludwig's Angina.

* It is the infection of floor of mouth also k/a submandibular space.

* Floor of mouth is made by mylohyoid muscle.

* Source of infection is dental roots

* Bacteria: mixed (MCA)

↓

Streptococci + Anaerobes

* C/F:

1) Chin swelling

2) Trismus

3) Sometimes respiratory distress.

* Rx: External incision & drainage + Antibiotics

* Sometimes tracheostomy may be required.

PHARYNX

* It is fibromuscular tube which extends from skull base to C6 vertebrae.

* Has 3 parts

1) Nasopharynx

2) Oropharynx

3) Laryngopharynx

Laryngopharynx

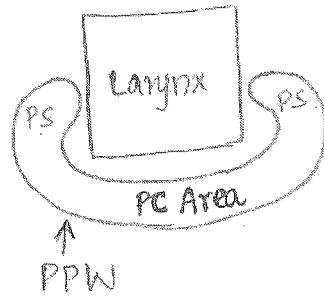
* Also k/a Hypopharynx

* It has 3 parts -

1) Pyriform sinus (right & left)

2) Post cricoid area

3) Posterior pharyngeal wall



* MC site of hypopharyngeal malignancy is

Pyriform sinus

Plummer Vinson Syndrome

- * Middle age female (40 yr)
- * Anemia (iron deficiency)
- * Dysphagia (post. cricoid web)

⇒ 40 yr old ♀ with post cricoid web
Plummer Vinson syndrome

Nasopharynx

- * Has 4 topics

(1) Thornwaldt disease

Infection of bursa of the nasopharynx.

(2) Adenoid

- Also k/a nasopharyngeal tonsil
- It is collection of lymphoid tissue which lies at the junction of roof & post. junction of nasopharynx.
- It has no capsule, no crypts, no definite blood supply
- It has irregular feel k/a bag of worm feel.

Adenoids are present at birth, they physiologically increase in size up to 6 yrs of age.

- Start decreasing in size at puberty
- Disappear by 20 yrs of age.

Adenoid hypertrophy

- * It is a disease of ~~school~~ school going age
- * Cause: Recurrent upper respiratory infections.

* C/c - Adenoid face

- Pinch nose
- Open mouth
- High palate
- Malocclusion of teeth.

* Patient can have glue ear

* Rx: Adenoidectomy

* Always palpate the adenoid before removal to confirm diagnosis

* Method: Curettage

↓
Done using St. Clair Thomson Adenoid Curette.

* Complications:

- Hemorrhage
- Injury to eustachian tube opening.
- Atlantoaxial subluxation (C₁-C₂)

Also k/a Grisel syndrome

(it is due to position of neck extension)

↓
This position also seen in tonsillectomy.

* C/I :

- 1) Hb < 10 gm%
- 2) Bleeding disorder
- 3) Active infection
- 4) Hypernasality

3) Angiofibroma

- * MC benign tumor of nasopharynx
- * It arises from sphenopalatine foramen.
- * Highly vascular tumor.

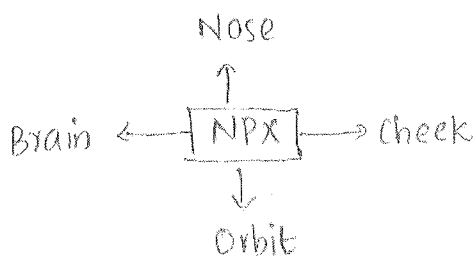
^{mca} * c/c : Profuse epistaxis (nose bleeding)

^{mca} * Biopsy is C/I. (since bleeding)

* seen in adolescent boys (12-14yr)

Highly vascular tumor in ENT
 1) Angiofibroma (only in ♂)
 2) Glomus jugulare (MC in ♀)

* It is locally invasive



^{mca} * If it invades to orbit → k/a Frog face deformity

^{mca} * 12 yr old boy with nasal mass with profuse epistaxis

* IOC → CECT

^{mca} Shows Hollman Miller sign
Also k/a Antral sign

↓
It is anterior bowing of the posterior wall of maxilla.

* Can do Angiography (vascular tumor) to find out main source of blood supply of tumor.

* Rx : Surgery.

4) Nasopharyngeal carcinoma

* MC in China

^{mca} * Aetiology is EBV (Eibstein barr virus)

↓
* (+ Genetics)

^{mca} * Site of Origin : Fossa of Rosenmuller

* It lies just above eustachian tube opening.

^{mca} * C/P → MC is metastatic cervical lymphadenopathy

↓
Also k/a 2° neck node

* Then nasal blockage & epistaxis
* Unilateral conductive hearing loss → glue ear due to eustachian tube blockage.

MOR
 * It can involve all CN except
7th & 8th CN

↓
 So facial palsy / sensorineural hearing loss will not be present.

↓
 When everything involved, i.e.
Trotter's triad

- Unilateral CHL
- Temporoparietal pain (5th CN)
- Palatal palsy (10th CN)

* Rx: Radiotherapy.

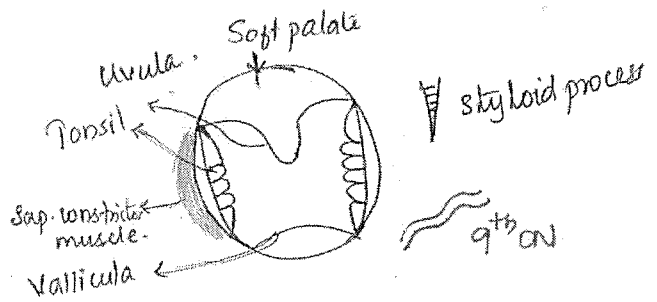
Gradenigo syndrome:

- Ear discharge
- Retro orbital pain (5th CN)
- Diplopia (6th CN)

Oropharynx

* It has following parts:

- 1) Soft palate, uvula
- 2) Uvula
- 3) Ant. & post. tonsillar pillar
- 4) Tonsil - Palatine tonsil
- 5) Base of tongue - Post. 1/3 of tongue which has lingual tonsil
- 6) Vallicula (end of tongue)
- 7) Posterior pharyngeal wall



* Bed of tonsil is made by Superior constrictor muscle.

* Styloid process & glossopharyngeal nerve lie in the bed of tonsil.

* ~~stylo~~

MOR stylogia / eagle syndrome

↓
 Long styloid process touching the 9th CN

↓
 It will cause throat pain referred to ear.

↓
 Rx: Styloidectomy.

* Tonsil has capsule, crypts

* Largest crypt in tonsil

Crypta magna



* Main blood supply of tonsil
 Tonsillar branch of facial artery.

* Venous drainage of tonsil

Paratonsillar vein

↓
 This is main source of bleeding during tonsillectomy

Tonsillectomy

* Complications are:

- 1) Primary hemorrhage (during surgery)
- 2) Reactionary hemorrhage (it is postoperative within 24 hr of surgery)

↓
due to slippage of ligature

MCQ Rx: Re-exploration

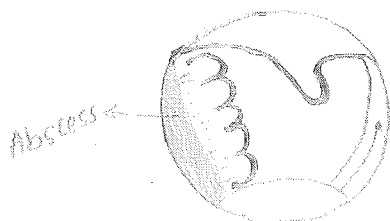
- 3) Secondary hemorrhage (after 5th day of surgery)

↓
due to infection of tonsillar fossa (mild bleeding)

MCQ Rx: i.v Antibiotics

Quinsy

- * Also k/a Peritonsillar abscess
- * It is collection of pus b/w tonsil and its bed (sup. constrictor muscle)
- * MC in adults
- * Mostly unilateral.
- * Examination → Tonsil is pushed medially, uvula is pushed to the other side



MCQ

* c/c:

- Throat pain
- Dysphagia
- Hot potato voice
- Trismus

* Rx:

Per oral incision & drainage in sitting position + Antibiotics

* Some surgeons remove tonsil to drain the abscess.

MCQ

↓
It is called Abscess/Hot tonsillectomy (hot → inflamed)

↓
But it is better to remove tonsil after 6 wks of abscess drainage.

MCQ

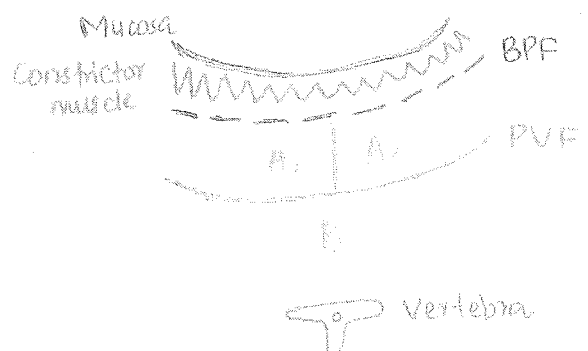
↓
This is k/a Interval tonsillectomy

Quincke's disease

* It is sudden idiopathic edema of uvula

Retropharyngeal space &

Prevertebral space



* Space A → Retropharyngeal space

* It is divided into 2 halves by a midline band

MCA * These 2 halves are k/a

Spaces of Gillette

MCA * This space has retropharyngeal LN → Also k/a LN of Rouviere

* Space B is Prevertebral space

Laryngeal Crepitus

* Present in normal people.
* Clicking sensation felt when larynx is moved over vertebra.

* It is absent in post cricoid carcinoma.

* Absence of laryngeal crepitus is called

Moure's sign.

| Space A abscess | Space B abscess |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Acute retropharyngeal abscess• Due to infection of retropharyngeal LN• MC in children• C/c - Respiratory distress, stridor, dysphagia• Examination shows unilateral bulge on post. pharyngeal wall.<u>MCA</u> • X-ray neck lateral view → <u>Widening of prevertebral shadow</u>• Rx → Incision & Drainage + Antibiotics | <ul style="list-style-type: none">• Prevertebral abscess• MC in adults• Due to TB of cervical spine.• C/c - Neck pain, dysphagia, low grade fever.• Examination shows midline bulge.• X-ray cervical spine shows pott spine features (TB spine)• Rx → Incision & Drainage + Antitubercular therapy. |

NOSE & PARANASAL SINUS

External nose:

- * It is made of 3 pairs of
 - 1) Nasal bones
 - 2) Upper lateral cartilages
 - 3) Lower lateral cartilages (or Alar cartilage)

* Alar cartilage designs the external opening of nose.

* Nasal valve → Junction of upper lateral & lower lateral cartilages

* Cottle's test → Done to check the blockage of nasal valve.

~~* MC~~

Nasal bone

* MC # of face

* Rx. → Immediate closed reduction (before edema starts)

* Done using

Walsham forceps

Nasal septum

* It is of 2 types

- Horizontal / Jarjaway #

- Vertical / Chevallet #

* Horizontal → force from front
Vertical → force from below.

* Rx is # reduction

* Using:

MC

Asch forceps

Nasal bone # : Walsham forceps
Nasal septum # : Asch forceps

Zygomatic

* Also k/a Tripod #.

* It is 2nd MC # of face

* C/F

1) Flattened malar eminence (below eye)

2) Step deformity of infra-orbital margin

↓
causes diplopia.

3) Anesthesia of cheek due to injury to infra orbital nerve

4) Trismus (difficulty in opening of mouth)

* Rx : Open reduction & fixation.

MC

⇒ MC # part of mandible

Condyle (subcondylar #)

Rhinophyma

* Also k/a Potato nose

* It is hypertrophy of sebaceous glands of skin of external nose.

* MC in males

- * It is a type of Acne rosacea
- * Rx → Laser excision + skin grafting

Rhinolith

- * Formation of stone in nasal cavity
- * MC in adults
- * Made of CaCO_3 , CaPO_4 , MgCO_3 , MgPO_4 .
- * c/c:
 - Nasal pain
 - Nasal blockage
 - Epistaxis (bleeding from nose)
- * Rx: Endoscopic removal.

MCQ

⇒ A 7 yr old child with unilateral, foul smelling nasal discharge & epistaxis

Foreign body nose.

(Infection → Bilateral)

MCQ

⇒ A 2 yr old child with polypoidal mass ^{in or} around nasal cavity

↓

Get a CT scan done first to rule out the possibility of encephalocele (brain herniation)

(roof of nose is base of brain)

Myiasis

- * Maggots in nose.
 - Clavae of housefly)
 - ↓
 - Chrysomia MCQ
- * Foul smelling conditions lead to myiasis
 - eg: Foreign body nose, Atrophic rhinitis,
- * Rx → Maggot oil instillation
- * Maggot oil contains:
 - Chloroform + Turpentine oil
- * Also use mosquito net.

NASAL CAVITY

- * 8 cm in length
- Lateral wall of nose (Important)
- * It has 3 projections k/a Turbinates
 - 1) Inferior
 - 2) Middle
 - 3) Superior
- * Variation → Some people have an extra turbinate above superior
 - ↓
 - k/a supreme turbinate
- * Bony part of turbinate is k/a Concha

MCQ

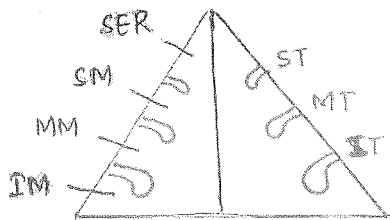
* Inferior concha is an independent bone.

* Middle & sup. concha are part of ethmoid bone.

* choana → It is the posterior opening of nasal cavity

* Meatus is the space below the turbinate.

- Inferior meatus
- middle meatus
- Superior meatus



* Sphenoethmoid recess → area above superior turbinate

Paranasal Sinuses

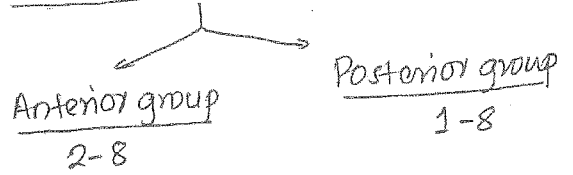
* 4 pairs (around nose)

- 1) Maxillary sinus
- 2) Frontal sinus
- 3) Ethmoid air cells
- 4) Sphenoid sinus

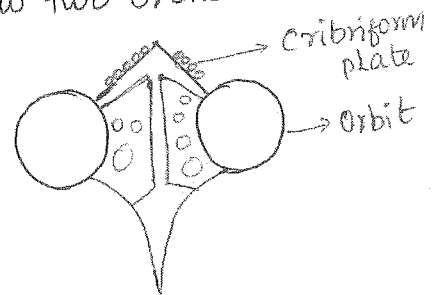
MCQ & Maxillary sinus is also k/a Antrum of Highmore

MCQ * It is largest sinus → 15 ml.

* Ethmoid air cells



* Ethmoid is a single bone lies b/w two orbits.



* Small holes in ~~ethmoid~~ ethmoid bone above → Cribriform plate

↓
Olfactory nerve passes

* Sphenoid sinus lies in the body of sphenoid which lies in the orbit.

* Sinuses produce mucous continuously which is discharged in to the nose.

* Every sinus has a specific area of drainage in the nose.

* Sinuses are ventilated during expiratory phase of respiration

MCQ

■ structures opening in nose

MCQ 1) Nasolacrimal duct → Inf. meatus

MCQ 2) Maxillary sinus
Frontal sinus
Ant. ethmoid air cell } Middle meatus

MCA
3) Posterior ethmoid air cells → Sup. meatus

MCA
4) Sphenoid sinus → SER
(Sphenoethmoidal recess)

Middle meatus

* It is the most important area for sinus drainage

* Has 3 landmarks:

1) Bulla ethmoidalis

↓
Most constant & largest ant. ethmoid air cell.

2) Uncinate process

↓
Sickle shaped bone which covers bulla ethmoidalis

3) Ethmoidal infundibulum

↓
It is a space b/w bulla ethmoidalis & uncinat process

* 3 sinuses open in to the ethmoidal infundibulum area of the middle meatus

↓
This whole complex (1,2,3) is k/a Osteomeatal complex (OMC)

* If OMC blocks → sinusitis.

C/P of sinusitis:

- ⊗ Nasal blockage
- ⊗ Purulent nasal discharge
- ⊗ Post nasal drip.
- ⊗ ↓ smell
- ⊗ Headache

MCA
⇒ office headache is a feature of frontal sinusitis

⇒ If duration of symptoms of sinusitis more than 3 months

↓
Chronic rhinosinusitis (CRS)

* Investigation:

MCA
1) Diagnostic nasal endoscopy is the first DOC

↓
pus present in middle meatus is an evidence of sinusitis

2) X-ray paranasal sinuses

↓ Water's view (open mouth)

MCA
Best x-ray view for all sinuses except ethmoid

MCA
3) CT scan → Best radiological investigation

* Rx: Antibiotic + Decongestant for 3 wks

↓
If no relief → Rx: Surgery
Surgery ⇒ FESS (functional endoscopic sinus surgery)

* Main aim of FESS to reopen the drainage of sinus.

MCO
 * Complications of sinusitis:

1) Orbital infection

MCO

MC seen in Ethmoid sinusitis

2) Mucocele formation

It is expansion of bony wall of sinus due to retained mucus inside it.



MC in frontal sinusitis

3) Pott's puffy tumor

It is osteomyelitis of the frontal bone which is a complication of frontal sinusitis.

Development of Sinuses

* Sinuses develop in this sequence:



* First → Maxillary

* Last → Frontal

* Ethmoid is most developed sinus at birth.

Variations of ethmoid air cells

Haller cell



lies close to orbital floor

Onodi cell



lies close to optic nerve.

Agger Nasi

* It is the anterior most anterior ethmoid air cell.

(Agge → front)
 (hindi)

MCOs

* MC benign tumor of sinuses
 Osteoma.

• Osteoma are MC in frontal sinus

* Malignancy is MC in the Maxillary sinus

* Mucocele is MC in the Frontal sinus

* Aspergilloma / fungal ball is MC in Maxillary sinus

Malignancy of sinuses

* MC sinus → Maxillary sinus

* Etiology: Exposure to

^{mca} 1) Nickel → Squamous cell Ca

^{mca} 2) Hayd wood dust → Adenocarcinoma

Also k/a Wooder Worker's Ca

* C/P of carcinoma maxillary sinus.

1) Cheek swelling

2) Anesthesia of cheek due to involvement of infra orbital nerve

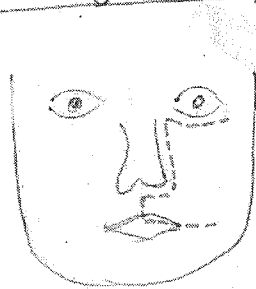
3) Nasal mass & Epistaxis (nasal bleeding)

4) Loss of upper teeth

5) Proptosis & loss of vision

* Rx: Total maxillectomy + Radiotherapy

^{mca} (by Weber Fergusson approach)



^{mca} * Ohngren's line → from medial canthus of eye to angle of mandible

tumors above this line has poor prognosis



↓
due to early orbital involvement.

Inverted Papilloma of Nose

^{mca} * Also k/a Ringertz tumor

* MC in males → 40-60 yrs

^{mca} * Arises from lateral wall of nose

* On histopathology examⁿ, this papilloma is seen to be growing inwards. (normally → above) epithelium.

∴ It is k/a inverted papilloma.

* So it is a locally invasive tumor.

* It can ~~also~~ sometime shows malignant change

* Rx: Surgery.

Atrophic Rhinitis (Important)

* Also k/a Ozeana

* It is atrophy of mucosa, submucosa & underlying bones of nasal cavity

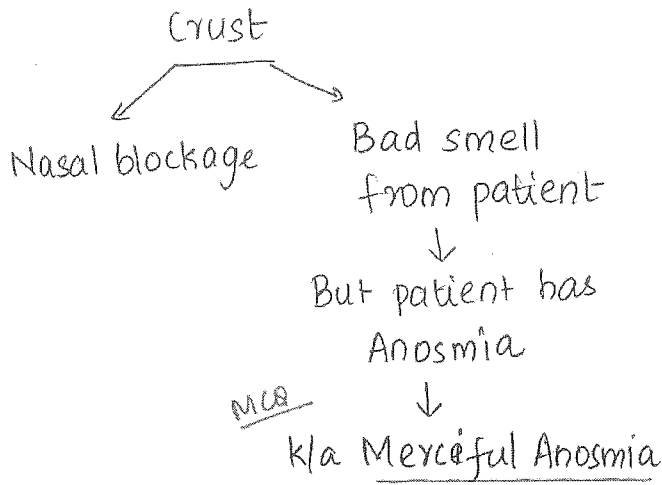
* It is MC in females.

* Cause → Autoimmunity or infection by Klebsella ozeana

* Examination: Turbinates are shrunken → wide, roomy, nasal cavities

↓
but full of crusts (dried mucus)

↓
Crust cause 2 problem



* Rx : Alkaline nasal douching (washing)

↓

MCA Powder contains NaHCO₃, sodium bicarbonate & NaCl

↓

If no relief then

↓

Rx: Surgery

- 1) Young's operation
- 2) Modified Young's operation
- 3) Lautenslager's operation

* Young's operation is total closure of one nostril for 6 months and then open it & do same on other side.

* Modified Young's operation is permanent partial closure of both nostrils at the same time

↓

Used nowadays.

* Lautenslager's operation is the medialisation of lateral wall of nose, so that nasal cavity becomes less roomy. (spacious)

Rhinoscleroma (important)

* Also k/a woody nose.

* It is chronic granulomatous infection of nose & upper lip.

* It is caused by Klebsiella rhinoscleromatis ~~rhinoscleroma~~ (Frisch bacillus)

* MC in North India (UP, Rajasthan)

* Stages:

1) Atrophic stage

Resembles Atrophic rhinitis

2) Granulomatous stage

3) Stage of fibrosis.

MCA

* Biopsy shows Russel bodies & Mikulicz cells

MCA

* DOC: Tetracyclin + streptomycin

Rhinosporidiosis (important)

* It is the infection of nose by Rhinosporidium seebri

* The infection is acquired by taking bath in dirty ponds used by animals also.

* MC in South India

* The infection can involve nose, oral cavity, conjunctiva & genital areas.

* Nose is MC site

* C/F → Mulberry like nasal mass and Epistaxis.

* Rx → Surgery (Excision of mass with cautery of base)

↓
Dapsone is given after surgery to prevent recurent

↓
So DOC is Dapsone.

CSF Rhinorrhea

* MC site is Cribriform plate

* MCC → Head injury / Trauma

* To confirm diagnosis

1) CSF is drop like water (non-sticky)

↓
Do Handkerchief test

2) Biochemical analysis (protein, sugar in CSF)

3) β_2 -transferrin estimation

↓
Most confirmatory test

* Best radiological investigation to find site of leak is

HRCT skull base

MCC

* Best Rx is conservative Rx for 7-10 days.

- Antibiotics

- Bed rest

- Elevate the head

- Cough suppressants

- Stool softeners

↓ CSF pressure

↓
If the leak does not stop

↓
Surgical repair.

Mucormycosis

* Fungal infection of nose by mucor group of fungus

* Seen in HIV +ve & young diabetics

* Mucor → Angioinvasive fungus i.e., it enters the blood vessels.

↓
so it reaches the orbit & brain

* It is a life threatening condition

* C/F: Blood vessels blocked

↓
Ischemic necrosis

Blackish mass in nose

BLACK

Blackish discoloration around eyes

* DOC → Amphotericin-B

Rhinitis Medicamentosa

* It is due to prolonged use of nasal decongestant drops.

eg: xylometazoline.



leads to rebound congestion

* Rx: Stop nasal drops + start steroid nasal spray

Vasomotor Rhinitis

* It is parasympathetic overactivity in nasal mucosa

* On change in temperature, patient have excessive watery nasal discharge.

* There is no seasonal variation

* Serum IgE levels are normal.

* Rx: Vidian neurectomy (VMR)

* Vidian nerve is also k/a

Nerve of pterygoid canal



Gives autonomic nerve supply to nose.

Allergic Rhinitis

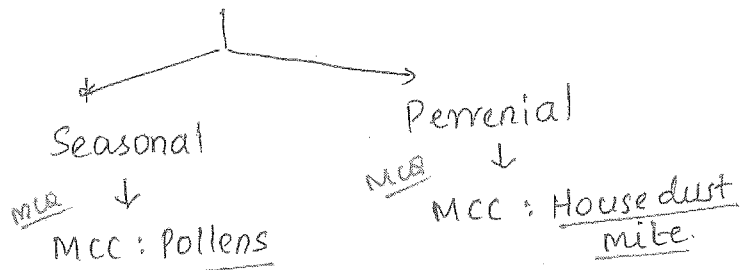
* It is type I allergic reaction

* IgE mediated.

* 2 types

1) Seasonal

2) Perennial



* Rx: Anti allergic drugs
eg: Cetrizine.

Nasal polyp:

* A polyp is prolapsed, ^{edematous} pedunculated mucosa of nose or sinus

* Cause → Chronic infection or allergy

↓
Inflammation

↓
Edema → Polyp.

* 2 types:

1) Antrochoanal polyp / Killian's polyp

• Originates from maxillary sinus and grows towards choana

• So it is better seen on posterior rhinoscopy.

• MC in children

• Due to chronic infection

• Single, unilateral

• Rx → FESS (endoscopic removal)

FESS > Polypectomy.

• Recurrence is less common

2) Ethmoidal polyp:

- Also k/a Nasal polyp
- Originates from ethmoid air cell
- Can be seen on anterior rhinoscopy.
- Mc in adults
- Due to chronic allergy
- Multiple, bilateral.
- Rx. → Topical corticosteroid nasal spray.

eg: Fluticasone

(Corticosteroids → anti-inflammatory)

↓
If no improvement

↓
Rx: **FESS**

But recurrence is very common.

(FESS - fundus endoscopic sinus sx)

MCB Sampter's triad

- ✓ It is allergy to Aspirin. (NSAIDs)
- ✓ Ethmoid nasal polyp
- ✓ Bronchial Asthma.

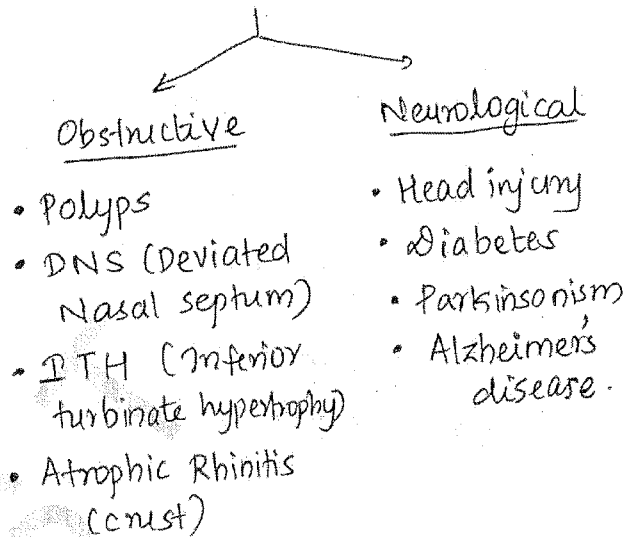
Olfaction

- * Olfactory epithelium lines upper 1/3 of nasal cavity.
- * Olfactory neurons pass through cribriform plate.

* Hyposmia is decreased sense of smell.

* Anosmia → total loss of sense of smell.

* Causes:



MCB Kallmann's syndrome

* Anosmia + Hypogonadism or infertility

* A patient ~~can~~ of anosmia can still sense NH_3 (ammonia)

↓
Because NH_3 is not a smell, it is an irritant

↓
It is sensed through Trigeminal nerve.

Cacosmia

- * Perception of bad smell from oneself due to a cause
eg: Dental infection

Parosmia

- * It is a paranoid sensation of bad smell from oneself without any cause.

Nasal Septum

- * It is made up of:

(a) 3 major parts

- 1) Septal cartilage / quadrangular cartilage.
- 2) Perpendicular plate of ethmoid
- 3) Vomer



b) 4 minor parts

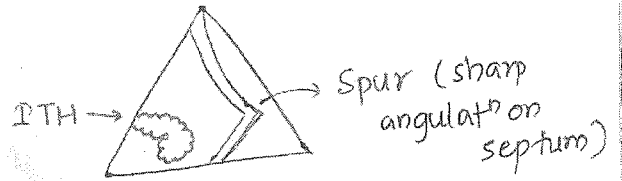
- i) Spine of maxilla
- ii) Spine of frontal bone
- iii) Rostrum of sphenoid
- iv) Crest of Palatine & Maxillary bones.

DNS

- * Deviated Nasal Septum

& It can lead to

- 1) Nasal blockage
- 2) ↓ smell
- 3) Sinusitis (due to blockage of drainage of sinuses)
- 4) Epistaxis (Nose bleeding due to spur formation)



- 5) Crust formation in patent (open) side due to ↑ airflow.

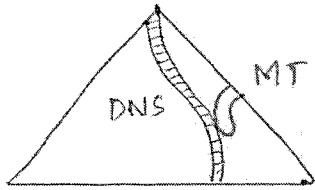
↓
There is compensatory ITH (Inf. turbinate hypertrophy) on patent side

↓
MCQ
ITH gives mulberry appearance of nasal mucosa

- Mulberry like nasal mass
Rhino sporidiosis
- Mulberry like appearance
ITH

- 6) External nasal deformities
- 7) Sudder's neuralgia

Sjodden's neuralgia
 ↓
 due to contact b/w DNS &
 middle turbinate
 ↓
 leads to neuralgic headache



* Rx/OC → Surgery - Septoplasty

Septal Hematoma

- * Cause: Trauma
- * Bilateral
- * c/c → Swelling around the nose & bilateral nasal blockage

MC * Rx. → Immediate Aspiration or drainage of hematoma

* Otherwise septal hematoma converts to septal abscess → septal perforation.

Septal Perforation

* Causes:

- 1) MC is Trauma
- 2) Septal surgery
- 3) Cocaine snuffing (vasoconstrictor → rush of blood to brain) ↓ ischemia of septum.

4) TB } Perforation of
 Leprosy } cartilaginous part
 Lupus }

MC Syphilis → Perforation of the bony part

Wegner's - granulomatous } Both

* c/c: Whizzling sound.

* Rx: closure of perforation using septal buttons (obturators)

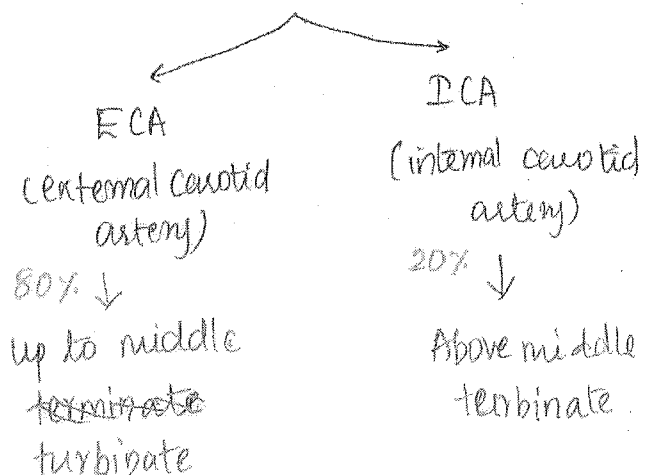
MC ⇒ MC complication of any nasal surgery is

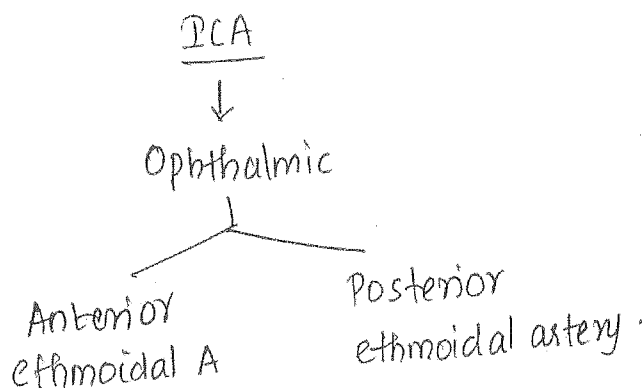
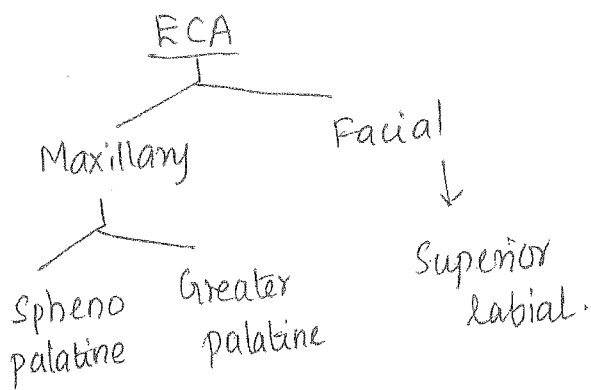
Synechia formation in nose (adhere)

↓
 Prevented by topical application of Mitomycin-C

↓
 Anticancer drug with additional anti-fibroblastic properties.

Blood supply of Nose





MCC
 ⇒ Artery of epistaxis is Sphenopalatine artery

Epistaxis (full MCC)

* MC area: Little's area

↓
 lies at antero-inferior part of the nasal septum.

↓
 this area has Keisselbach's plexus of 4 arteries

- 1) Sphenopalatine
- 2) Greater palatine
- 3) Sup. labial
- 4) Ant. ethmoidal.

* (except post. ethmoidal A)

* Other area:

Woodruff plexus

↓
 posterior, lateral wall & venous

* MCC → Finger nail trauma / Nose picking.

* Other causes:

1) Hypertension

- Seen in elderly patients

- Posterior epistaxis

- MC source: Sphenopalatine artery.

2) Bleeding disorders

3) Drugs → Anticoagulants

4) Hemorrhagic fever (Dengue)

5) Foreign body nose, Rhinolith

6) Infection.

7) Tumors.

* Management:

1) Pinch the nose for 5-7 min

2) Chemical Cauterization of Little's area with Silver nitrate

MCC
 3) Anterior nasal packing on both sides

4) Posterior nasal packing (OT procedure)

MCC
 5) ESPAL (Endoscopic Sphenopalatine artery ligation)

6) Maxillary artery ligation

7) Ext. carotid artery ligation
(done at the level of neck)

⇒ Differentiate b/w ECA & ICA

- ICA has no branch in the neck
- But ECA has 8 branches in the neck.

me

⇒ If bleeding persists even after ECA ligation, then source of bleeding is ethmoidal arteries

↓
So do their ligation

